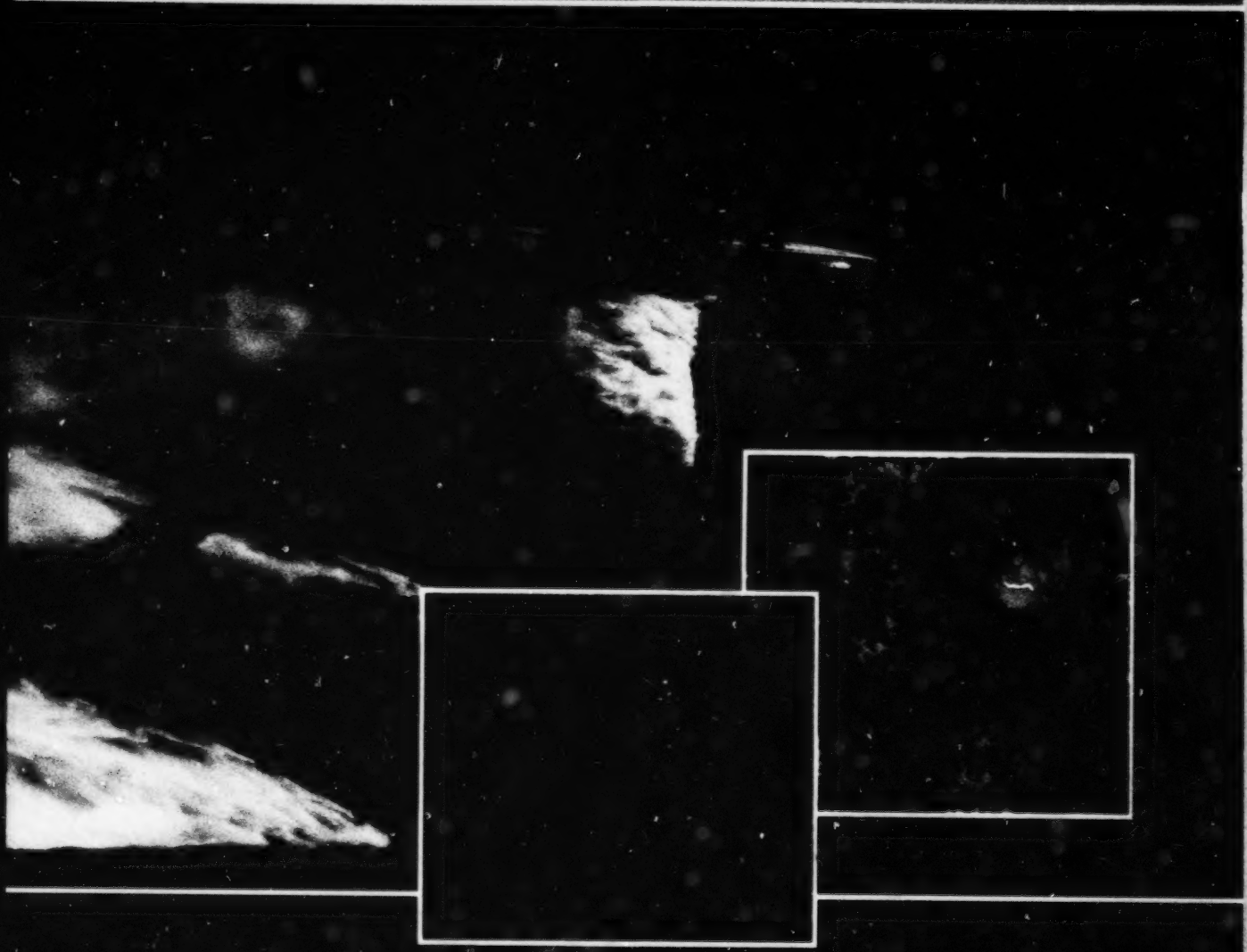
ONTARIO MINISTRY OF THE ENVIRONMENT
ANNUAL REPORT 1983-1984



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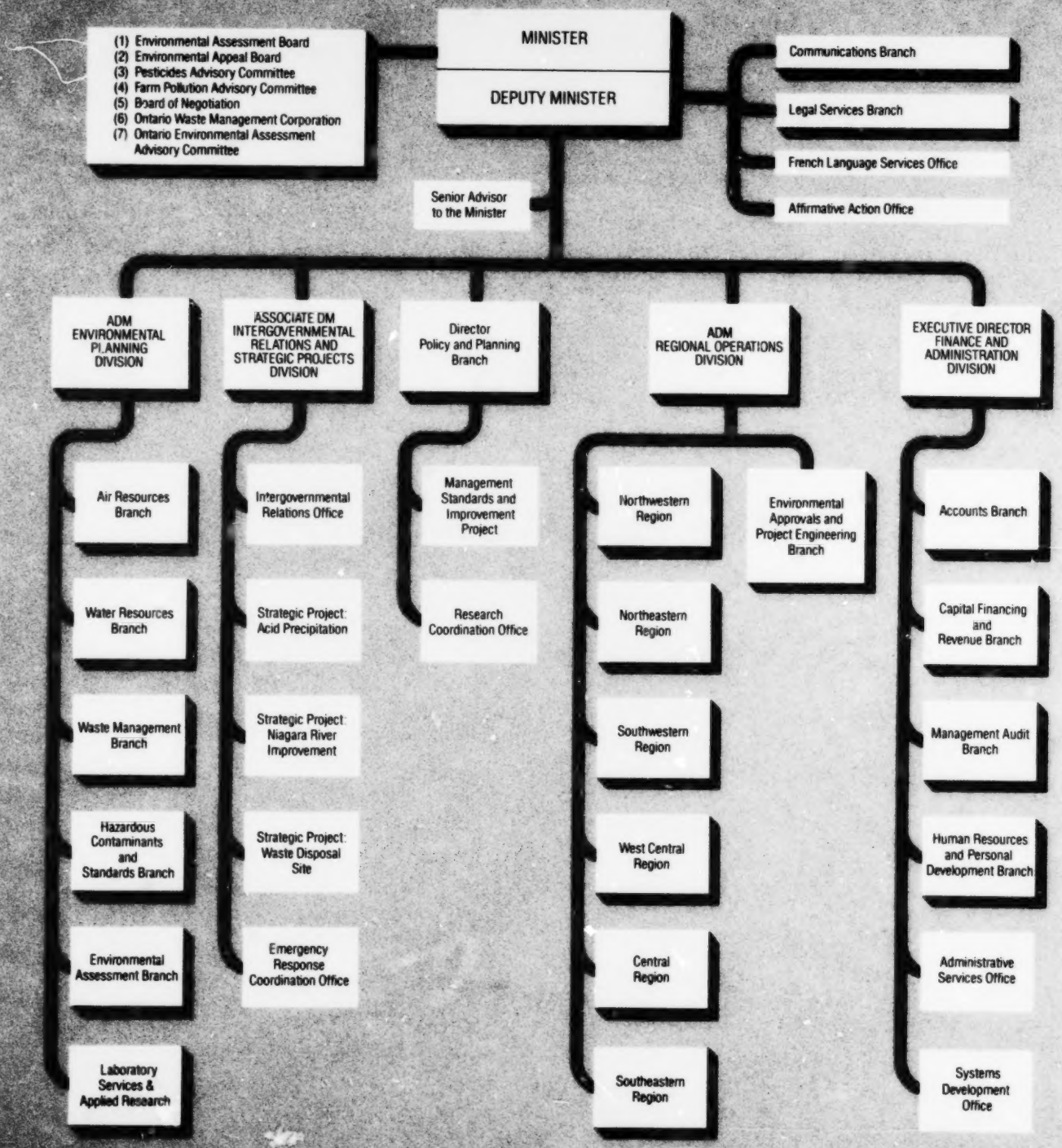
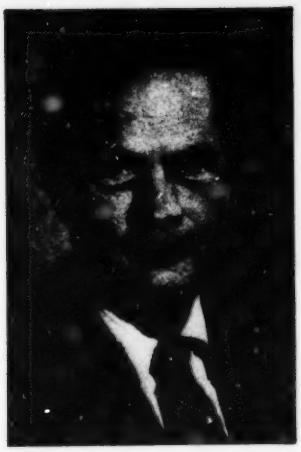
ONTARIO MINISTRY OF THE ENVIRONMENT





To:

The Honourable
Andrew S. Brandt
Minister

Sir,

I have the honour to submit for your approval the annual report of the Ministry of the Environment for the year 1983-84.

Respectfully submitted,

Allan E. Dyer, M.D.
Deputy Minister

To:

His Honour,
The Lieutenant-Governor
of the Province of Ontario

May it Please Your Honour,

I have the privilege to present the annual report of the Ministry of the Environment for the fiscal year beginning April 1, 1983, and ending March 31, 1984.

Respectfully submitted,

Andrew S. Brandt
Minister

Minister's message

I am privileged to present this report on the activities of the Ministry of the Environment during the fiscal year 1983-84.

In discussing specific projects and programs carried out by my Ministry in 1983-84, I wish to emphasize that I attach the highest priority to drinking water safety.

Ontario water supplies are of top quality. Tests have proven that drinking water in Metro Toronto is purer than bottled water available for purchase.

Nevertheless, my Ministry has undertaken extensive studies on the effectiveness of alternative water treatment processes.

In addition, my Ministry has commissioned a new $1 million pilot study at the Niagara Falls water treatment plant. Protection of the Niagara River also continues to be a major priority of my Ministry. Our environment is threatened by numerous landfill sites on the New York side of the river, and we want to take an active part in cleanup plans for these sites, not merely make recommendations to U.S. authorities.

Ontario has already been granted the right to intervene in one U.S. court case, and we will continue to use the courts to gain direct participation in others.

A partnership agreement between my Ministry and U.S. environmental agencies is leading to improved conditions on the Great Lakes.

A good barometer of the success of this arrangement is the fisheries. Our Guide to Eating Ontario Sport Fish now shows that we can eat more fish than in the past, since testing indicates a general decline in the contaminants absorbed by the fish.

Communal sewage systems have now been provided for 94 per cent of Ontario's urban population. The Ministry also operates some 380 communal water and sewage treatment plants, and over the past five years we have spent more than $17 million on sewage treatment facilities in the Niagara Region alone.

Major projects by my Ministry this past year have included a new water treatment plant at Port Colborne; and a $3.5 million commitment to upgrade the Niagara Falls sewage works. In addition, my Ministry is continuing its $3 million program supporting the repair of faulty water tanks owned by small municipalities.

Acid rain is a provincial, national and international problem, and since the Fredericton Accord of 1983 I have been working with my provincial and federal colleagues to develop an effective and affordable abatement strategy.

Since 1980, for example, Ontario has spent more than $31 million on the acid rain problem. Our position has been strengthened by the March 6, 1984 agreement between Canada and seven of the provinces. This agreement states that eastern Canada's sulphur dioxide emissions will be reduced by 50 per cent from 1980 levels by 1994.

Unilateral Canadian action will not solve our acid rain problem, however, as studies show that at least half of the acid rain deposition in Canada is caused by emissions from across the border. Nevertheless, the position of the U.S. government is that more research is needed to establish a cause-effect relationship.

But despite the reluctance of Washington to take action, there are encouraging signs of co-operation, including a Memorandum of Understanding we have signed with New York State's Department of Environmental Conservation. I expect to sign more agreements with other states as well.

Concerning the vital area of air quality monitoring, my Ministry is developing a new air quality index with equipment costing about $1.7 million.

In dealing with the problem of polychlorinated biphenyls, or PCBs, my Ministry is committed to the destruction of PCBs now in storage in Ontario. We have developed proposals for the regulation of mobile destruction facilities, which are being examined by a special commission.

An extensive public consultation program was also implemented following the release in June, 1983, of the "Blueprint for Waste Management". The Ministry is now prepared to go ahead with programs that will provide a comprehensive waste management system for Ontario.

This year we have distributed $400,000 among 16 municipalities to improve or close their waste disposal sites, and altogether about 30,000 tonnes of waste are being recycled by municipalities. Since its inception in 1981, the Ministry's Source Separation Program has provided $1.5 million to recyclers.

I rate our environmental researchers among the best on the continent. More than two million tests are conducted annually at my Ministry's world-class Central Laboratory in Toronto, and at other laboratories in Thunder Bay, London and Kingston.

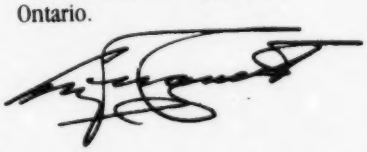
Recent advances in technology enable Ministry scientists to measure substances in water down to one part per quadrillion. To put it another way, this is the equivalent of being able to select one second out of 32,000 years.

My Ministry is also involved in consultation on issues connected to the reform of Ontario's environmental laws, meeting with citizen's groups on a variety of subjects of concern and streamlining the Environmental Assessment process.

When I assumed the environment portfolio in July of 1983, I saw my role as essentially that of a conciliator. I believe that persuading people to work together accomplishes more than mere rhetoric or shrill comment.

There are, unfortunately, times when appeals to good citizenship and the wisdom of co-operation fall on deaf ears, and in those cases my Ministry has applied our enforcement mechanism on violators. This year, due in large part to the efforts of our police-trained Special Investigation Unit, we laid twice as many charges as in the previous year.

Other problems remain to be solved and new demands will arise in the future. But I believe that the points I have touched on here, and the overview of the programs of my Ministry contained in this report, demonstrate our determination to work co-operatively with government, industry and the public to protect the health and environment of the people of Ontario.



Andrew S. Brandt
Minister.

Deputy Minister's message:

I was appointed Deputy Minister of the Environment in August of 1984, and thus was not involved in the work of the Ministry during the period covered by this annual report.

Nevertheless, I was aware, even before I joined the Ministry, that it has made great strides forward since its inception in 1972.

We have gone a long way in cleaning up conventional sources of environmental pollution. Present areas of concern are associated mainly with chemicals, the consequences of our growing industrialization in response to the demands of modern society.

I believe an important obligation of the Ministry is the interpretation to the public of the progress we have made.

The public is entitled to clear and objective explanations of technical findings, the effects of contamination and pollution, and the costs and benefits of controls.

In other words, scientific programs and findings must by interpreted in layman's language; this report attempts to do just that in describing the Ministry's acitivities.

It will be seen from the report that we can be justly proud that we are in the forefront of environmental abatement and protection.

As never before in history, the public is demanding that the environment be protected and preserved for future generations, and it is the primary role of this Ministry to meet the demands of that public expectation with strong and vigorous action.

It is also our task to be vigilant in monitoring potential problems and to act quickly to bring those problems under firm control.

As a corollary to the Ministry's efforts at pollution abatement, I might add that this Province enjoys a growing reputation as a base for the manufacturing and supply of pollution abatement equipment, including instruments for water and air pollution controls.

Our policy analysts estimate that 65 per cent of Canada's pollution control equipment and service industry is now based in Ontario, with about 2,700 people employed in equipment manufacturing.

I am convinced that we can use the skills and experience of both the public and private sectors of Ontario's environment industry to develop new products, as well as scientific and engineering expertise, for the growing world market.

And I firmly believe that this activity has been stimulated in large part by the high priority that the government and this Ministry have placed on environmental protection.

Allan E. Dyer, M.D.
Deputy Minister.

Regional Operations Division

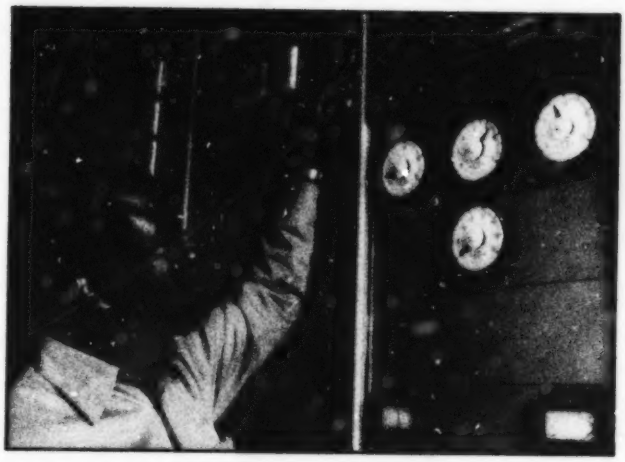
1983-84 Regional operations highlights:

- Special Investigation Unit unearths illegal dumps.
- Citizens, companies and government co-operate to check pollution.
- Ministry makes practical preparations for a gold rush.
- Ministry money and advice aids municipal waste disposal.
- Source separation recycling operations funded.
- Cat-tail marshes used to curtail contamination.
- Sudbury science centre gets new air monitoring station.
- Laboratory develops new technique for pinpointing pungent odors.
- Advance planning assists acid lake identification.
- Ultraviolet lamps shed new light on sewage treatment.
- New $1 million pilot plant for drinking water treatment opened.
- Government loans and grants help build municipal water and sewage treatment plants.
- York-Durham sewage system nears completion.
- Value engineering cuts construction costs.
- Ministry scientists pioneer developments in water storage tank construction and repair.
- "Red mud" research improves private sewage systems.

Operations in the field

In effect, the Regional Operations Division provides the Ministry with front line field troops for its fight against pollution.

The role of the Division includes the regulating of matters concerned with pollution sources, construction and operation of water and sewage treatment facilities, the development, operation and closure of landfill sites, the storage and use of pesticides, and the operation of Ministry water and sewage systems.



Also included in the Division's tasks is the monitoring of environmental quality, the evaluation of projects and environmental assessment regulations, the regulating of water use and noise control, and responding to public complaints and environmental emergencies.

To carry out this formidable mandate, the Province is divided into six regions: Northwestern, Northeastern, Southwestern, Central, West Central and Southeastern.

Each area has its own regional and district offices, and the Division also contains a head office and an Environmental Approvals and Project Engineering Branch.

Dispersed among the regions are members of the Ministry's Special Investigation Unit, who conduct investigations and collect evidence on illegal practices such as the unauthorized hauling or dumping of hazardous waste.

Trained in police and courtroom procedures, all SIU members are designated as Provincial Offences Officers.

Citizens report industrial pollution

One of the most important functions of the regional offices is pollution abatement, which involves taking direct action to reduce, or forestall, actual cases of air or water pollution.

As might be expected, in northern Ontario the most serious problems to be overcome from industrial sources are those from mining and smelting operations, and from the pulp and paper industry.

Southern Ontario, on the other hand, has a wide range of manufacturing industries and chemical plants. The situation is particularly sensitive in the older sections of cities, where industry is often located next door to residential areas.

A good deal of the day-to-day work in the regions consists of investigating complaints from members of the public who report specific instances of pollution.

The number and type of instances varies a good deal between the regions from year to year and the numbers themselves can often be misleading.

This year, for instance, the West Central Region investigated 2,242 complaints, of which more than half were about bad odors. Fifty-five spills of industrial chemicals were reported.

By comparison, in the Northeastern Region there were 792 complaints and 436 chemical spills, most of which were centred around the Sudbury area.

The extraordinary number of complaints about bad odors does not in fact mean that the West Central Region is now overwhelmed by noxious smells, but actually reflects an odor problem at only two specific plants, at Rothsay and Breslau.

The Sudbury figures, on the other hand, reflect a substantial increase from previous years, and appear to indicate to the Division that the public in the area is showing an increased awareness of the importance of reporting all signs of chemical spills.

Investigating fish kills

In July 1983, an accidental spill of resins and fatty acids from a pulp and paper mill on the Spanish River in northern Ontario killed more than 100,000 fish in seven days.

The results of the accident caused great concern at a nearby Indian reservation.

Investigators from the Northeastern Region conducted an investigation and laid charges against the company responsible for the spill. At year's end, the matter had not yet come to court.

Another fish kill was the subject of a prosecution this year at Rothsay, where a company in the business of rendering animal fats and wastes allowed, through over-irrigation, effluent from a treatment lagoon to run off the flooded land into a creek.

Treatment lagoons were not functioning properly and the effluent had a high ammonia content.

The investigation was carried out, and charges laid, by the West Central Region's Special Investigation Unit.

Detecting industrial waste

In Bruce County, a sand trucker bought a sand pit and built a new home alongside it. When his wife complained of a strange taste in the water from their well, he asked the Ministry to investigate.

After discovering some drums of industrial waste illegally buried in the pit, investigators from the Southwestern Region brought in an expert to make a survey of the entire property, using a sophisticated metal detector called a magnetometer.

About 230 more drums were unearthed, containing oils, industrial solvents, and metal grindings.

The investigators traced these drums back to a waste disposal operator whom a machine shop had hired to dispose of its waste seven years earlier.

At that time, the local landfill site had been declared unsuitable for this type of waste, and the waste disposal contractor had saved himself a journey farther afield by simply burying the waste in the sand pit, which he owned.

As a result of this year's investigation, the originators of the waste paid for its disposal at a suitable site and a court action was initiated against the waste disposal operator who had buried the drums on the property.

Another investigation this year, this time by the West Central Region's Special Investigation Unit, resulted in a large chemical company being fined $14,500 for the illegal disposal of industrial waste, and a related safety violation.

The company had been carrying out construction work on its own site when workers uncovered industrial wastes which had been buried there earlier.

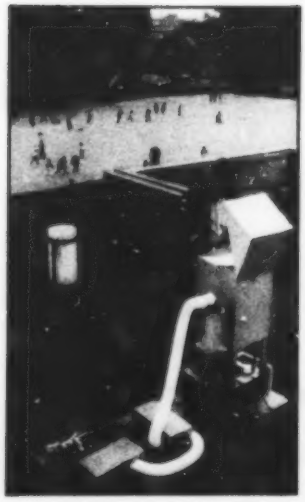
The workmen then dug up the wastes and buried them elsewhere on the site, but in doing so some of the workers became nauseated by fumes, and the Ministry was informed.

As a result of the SIU investigation of the incident, the wastes were properly disposed of and the company hired consultants to ensure that no other wastes are still buried on the site.

Toronto's Junction Triangle

Most large North American cities still contain old established industrial sites that are built cheek-by-jowl alongside residential areas.

A prime example is the Junction Triangle area of Toronto's west end, which contains about 5,500 people and 20 factories.



At the time the area was developed the industrial operations were modest, and it was convenient for workers to live within walking distance of their jobs.

In those "simpler" days, most people regarded this kind of industrial activity as evidence of prosperity.

Since then, however, industrial operations have become larger and more complex, and most of the residents no longer work in the industries in their midst.

Because of complaints about smoke, odors, and other signs of pollution, the city established a task force and public meetings were held to study the Junction Triangle pollution problems.

The Ministry of the Environment placed the area on a special alert system that guarantees the prompt arrival of an inspector at the scene as soon as a complaint is made.

This year, as part of the Ministry's intensive abatement program, an Environmental Liaison Committee was established to work out the problems of the area in a co-operative way.

The committee includes representatives of citizens' groups, the major companies in the area, and health officials from the city.

All companies ordered by the Ministry to undertake abatement programs have now complied with Ministry requirements, and have shown improvements in their operations.

The Ministry also contributed funds to a study of the health of the local residents.

Combining to clean up PCBs

At a public meeting in November, 1983, a major polychlorinated biphenyls (PCBs) cleanup program was outlined for General Electric's Davenport plant, in Toronto's Junction Triangle.

The program, now in effect, is to contain and remove oils contaminated by PCBs, which were found in several parts of the property.

The cleanup is under the general supervision of the Ministry's Central Region and the Junction Triangle Environmental Liaison Committee.

PCBs, which make efficient electrical insulators, were used in the manufacture of electrical transformers on the site for 30 years, until they were banned in 1977.

Co-operating on asbestos

Another example from the Central Region illustrates the manner in which a co-operative approach can simplify a public hearing process.

Manville Canada produced asbestos cement pipe on a site in Scarborough for 30 years, then closed the plant and proposed to sell the land for development.

The problem was that in the course of time, waste containing asbestos had been deposited on various parts of the property.

Manville's plan was to gather this waste together and dispose of it in one area, so that the land could be free for development.

Local residents were worried that during and after these consolidation arrangements asbestos fibres would be a general hazard to the public and the workers on the site.

A hearing of the Environmental Assessment Board was held in November, 1983, and prior to the hearing the Board suggested that the Ministry, the company, and local citizens get together to work out a negotiated position.

This negotiated position, already worked out between the interested parties, was then presented at the hearing, greatly simplifying the whole process.

The hearing was completed in March, 1984.

Public participation in South Riverdale

The South Riverdale area, in Toronto's east end, provides yet another example of the emphasis placed by the Ministry on involving local residents in the decision making process.

Citizen-representatives of the South Riverdale Environmental Liaison Committee meet regularly with Central Region staff, city health officials, and officers of local companies to discuss health and environmental problems.

Their participation in these meetings this year has influenced Ministry action in a number of cases.

Problem industries in the area include a tannery, which was made this year to comply with the requirements of a Ministry control order on its operations, and a soap and detergent manufacturer who is currently undertaking studies to identify the sources of odors and other emissions.

As a result of controls imposed by the Ministry, lead emissions from a smelter in the vicinity are now in compliance with approved standards.

A problem remains, however, with the lead that has accumulated in the soil over the years, especially in residential areas, and the views of Liaison Committee members are a valuable asset in the Ministry's efforts to find a solution.

Practical preparations for a gold rush

Gold was discovered in the Hemlo area, 300 kilometers east of Thunder Bay, over a century ago, but the gold field is only now being developed.

Of the three companies involved, only Noranda Mines has made a formal application to the Ministry, calling for a 1,000 tonnes a day operation by January, 1985, which will expand to about 3,000 tonnes per day by 1987.

Among the three companies there are 77 million tonnes of ore in reserve, and it's estimated that more than 750 people will be employed.

Since the gold does not come in grains or nuggets, but is dispersed as tiny spots throughout the ore, it takes four tons of this ore to produce one ounce of gold.

Environmental concerns that must be taken into account by the Ministry include the intake of water used in processing the ore, the treatment of waste water, and the discharge of effluents into streams.

In addition, the nearby communities of Marathon and Manitouwadge will be expanded to absorb an influx of new workers and their families, and will need larger water and sewage plants and waste disposal sites.

Several public meetings were held by Northwestern Region staff during 1983-84 to explain Noranda's proposals and to assess the public's response.

Some people were worried about the effect on fishing and hunting in the area, cottagers were concerned about the water in their local creek, an Indian band was anxious about environmental damage, and Pukaskwa National Park is located downstream on the Black River.

After five public information sessions and two public meetings, the Ministry finally approved a tailings inpoundment area and waste water treatment system for Noranda Mines in February, 1984.

"Tailings" refers to the liquid which remains after the gold has been extracted from the pulverized ore. After settling in the tailing ponds, the liquid will be treated to remove cyanide and heavy metals before being discharged.

About 15 per cent of Noranda's total production costs at Hemlo are expected to go towards environmental programs, and the company is also committed to a program of reclamation and stabilization of the mine site after it has been closed.

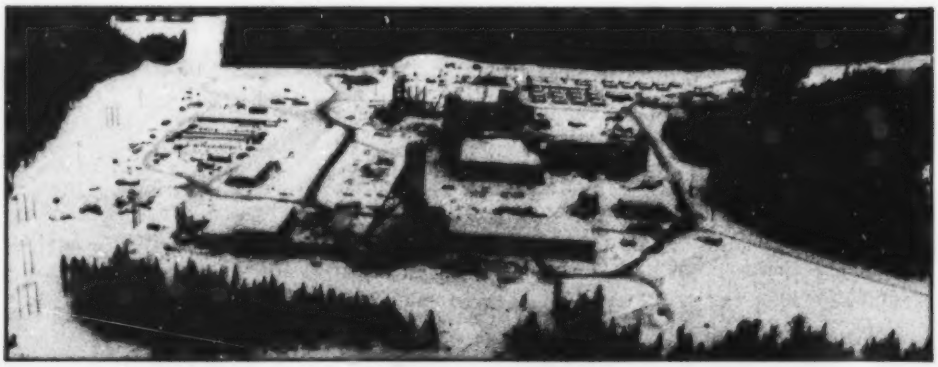
Refineries reduce sulphur dioxide

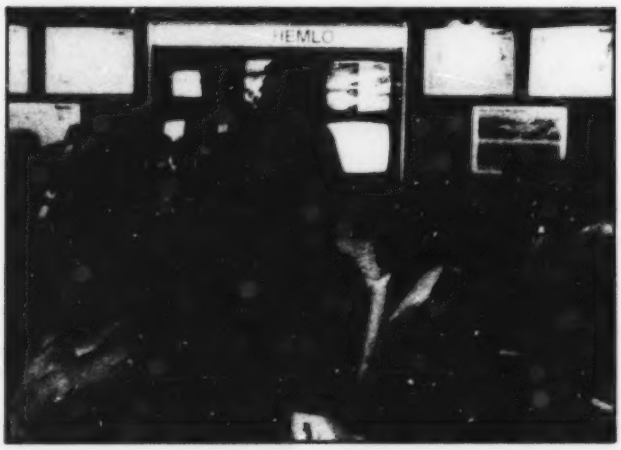
The reduction of sulphur dioxide emissions, which are a major component of acid rain, is a priority task throughout all of the Ministry's regions.

In the Northeastern Region, for example, new sulphur dioxide control programs were placed this year on the International Nickel Company's Copper Cliff nickel smelter and refinery complex, and at a nearby Falconbridge operation, where the company will develop and operate a new emissions control system.

In the West Central Region, $10.6 million was spent this year by Stelco and Dofasco steel plants in Hamilton to comply with Ministry requirements for reduction of air and water contaminants.

A major reduction in sulphur dioxide in the last 10 years means that the main emphasis with regard to air pollution is now on the control of minute particles (particulates) in the air.





Keeping an eye on water and waste

Inspecting and monitoring water treatment plants, sewage treatment facilities and waste disposal sites is an important part of the activities of regional offices.

Examples from the West Central and Central regions provide a good overview of the extent of individual on-site inspections carried out by regional staffs during the year.

In the West Central Region, 429 visits were made to municipal sewage and water treatment plants, 330 visits to waste disposal sites and 290 inspections were made of sewage sludge disposal sites.

Central Region's visits were as follows: 1,809 to sewage and water treatment plants, 1,052 to waste disposal sites, and 569 to sewage sludge sites.

Money and advice aids municipalities

During 1983-84, the Ministry provided both money and advice to municipalities for the improvement of their waste disposal sites.

In the Central Region, 15 municipalities received $96,000 for improvements to such sites, ranging from the provision of fencing to equipment designed to prevent the escape of methane gas and leachate.

Ministry money and expertise was also used during the year to encourage municipalities to develop waste management master plans.

The idea is that a municipality, or group of municipalities, can consider a wide range of options for disposing of their wastes, and also take into consideration the Province-wide picture before deciding on the best way of solving their own problems.

Regional staff members often sit, in an advisory capacity, on local committees set up for this purpose.

Master plans were begun this year for the County of Essex, Grimsby, Hearst-Kapuskasing-Cochrane and Black River-Matheson; and the regional municipalities of Niagara, Haldimand-Norfolk, and Sudbury.

Submissions received this year by the County of Essex, in the Southwestern Region, indicate the kind of alternatives reviewed by local committees and regional staffs throughout the Province.

Proposals from companies dealt with mass burning incinerators, refuse-derived fuel incinerators (which burn garbage), composting, and long distance hauling and disposal of refuse.

Since public participation is always an important part of the decision-making process, regional staff are involved in numerous public meetings held to fully explain the alternatives.

Because it may be some years before a suitable landfill site is available, regional and County of Oxford staffs have developed a contingency plan.

The basis of the plan is to fill consecutively all the remaining landfill sites within the county, and then, if necessary, truck the wastes to a site outside of the county.

Laboratory waste disposal

The disposal of pathological wastes from medical laboratories has increased a great deal in recent years, creating new challenges for Ministry waste disposal experts.

Today, 80 per cent of pathological (disease infected) wastes handled by licensed haulers comes from laboratories, and is largely made up of plastic containers and other disposable laboratory supplies.

Specially designed incinerators are required for the disposal of this type of waste, and an incident that took place this year in the Central Region provides a good illustration of the health hazards created when things go wrong.

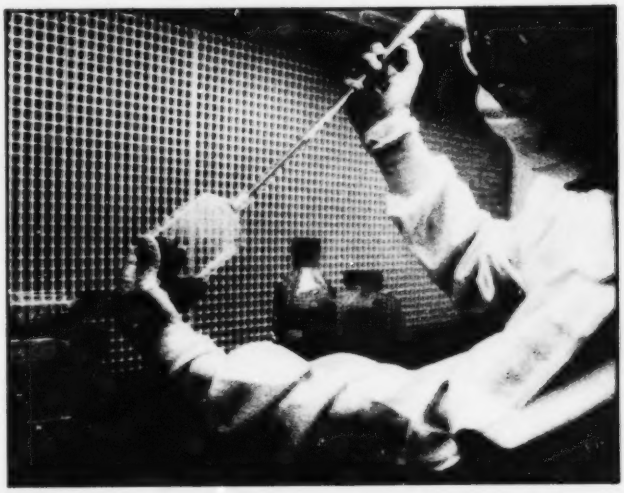
A hospital incinerator which was being used by a major pathological waste disposal contractor developed operating problems and was withdrawn from service.

In the spring of 1984, approximately 50 tonnes of the contractor's pathological wastes were found stored illegally in a trailer and warehouse in Markham.

Unable to destroy the wastes, the contractor had simply stockpiled them during the winter.

Ministry staff moved swiftly to transfer the contaminated wastes to refrigerated storage and arrange for their emergency disposal.

The wastes were then incinerated, under staff supervision, at the Federal Government's Animal Disease Research Institute in Ottawa and the Ministry's Experimental Resource Recovery facility at Downsview.



Recycling funded

Ten recycling operations in 15 Ontario municipalities received grants totalling $890,000 this year, under the Ministry's source separation program.

The municipalities have a combined population of one million people.

As the name implies, source separation consists of separating wastes that can be recycled from other wastes before they are disposed.

A good example of how the grants are used comes from Kitchener, in the West Central Region, where the Ministry gave a grant of $110,000 to Laidlaw Waste Systems.

The company used the grant to expand a pilot project into a city-wide source separation system serving a population of 140,000.

The company provides colored plastic containers to homes, for the disposal of glass, paper, and metals, and collects these recyclable materials weekly in specially-designed one-man trucks.

Cat-tails curtail contamination

Scientists from the Ministry's Northeastern Region literally went "back to the land" this year, when they put into operation a new experimental system that uses cat-tail reed marshes instead of expensive sewage treatment plants to purify water.

The project, located in Cobalt, involves pumping raw sewage into a specially prepared artificial cat-tail marsh, which provides a stable environment for micro-organisms that are essential to sewage treatment.

The nitrogen and phosphorus in the sewage are absorbed by the marsh plants as they grow, and in contrast to the more random flow of water in natural marshes, the artificial marshes can be carefully laid out to prevent "short-circuiting" of the flow and ensure that all areas of the marsh are used.

The Ministry has had good results from similar experimental marshes in southern Ontario and wants to know what the effect of the colder climate of northern Ontario will be.

If this year's experiment is successful, it will provide an inexpensive solution to Cobalt's sewage treatment problems.

Ministry administers private sewage

In certain parts of Ontario, the Ministry of the Environment, rather than the local health unit, administers Part VII of the Environmental Protection Act, which deals with the approval and use of private sewage systems.

There are 700,000 of these private sewage systems, serving two million people, in the Province.

This year, for example, there were 1,690 applications for Certificates of Approval submitted to the Southeastern Region, and staff investigated approximately 675 complaints.

In the Central Region's Muskoka-Haliburton recreation area, 879 private sewage systems were inspected, and 253 were found to be malfunctioning or causing pollution.

In the District of Muskoka alone, staff made 2,537 inspections in connection with the installation of new septic and holding tanks.

Students taught environmental awareness

Since 1967, Central Region staff members have talked to about 7,000 Grade Five and Six students from public schools in the District of Muskoka and the County of Haliburton.

The idea of the visits is to instill environmental awareness in the children, and it has been found that it is these grades that are the most receptive.

During the lessons the youngsters are shown equipment such as pH meters, depth samplers, jar testing apparatus, soil probes and augers, and acid rain monitoring instruments.

The students also prepare projects, posters, essays, poems and models, which are evaluated by the visitors from the Ministry.

The 12 children who prepare the best projects receive certificates of merit signed by the Minister and get to spend an "environmental work day" with staff workers in the field.

Activities may include a tour of a sewage treatment plant in the morning and an afternoon trip out on a lake, helping a biologist to carry out experiments.

The lake trip, incidentally, was originally designed as a simple cruise, but the fledgling environmentalists asked to take part in more concrete activities.

The program alternates between Muskoka and Haliburton, and this year it was Haliburton's turn, with 284 students involved in the projects and activities.

During 1983-84, the Southwestern Region operated 71 monitoring instruments, 85 suspended particulate samplers, and 23 monthly sampling monitors.

The West Central Region operated more than 200 monitors, and the Northwestern Region operated a total of 113 monitors and precipitation samplers. Central Region, in its turn, maintained a network of 460 monitoring instruments in 26 communities.

Assessing the air

Regional offices continually operate air quality monitoring instruments and instruments to measure suspended particulates in the air.

The airborne particles measured by the instruments include both pollutants and natural substances such as pollen.

Statistics from four regions give a good picture of the amount and type of air quality monitoring that is continuously going on in all areas of the Province.

Air monitoring goes public

Visitors to Science North, Sudbury's celebrated science centre, will have the opportunity of taking a behind-the-scenes look at a genuine air quality monitoring station, as a result of Ministry initiatives this year.

The science centre, located in the Ministry's Northeastern Region, received a $100,000 grant to set up an exhibit built around the air quality monitoring operation.

The Ministry also furnished the equipment to be installed in the working station, which will provide information on sulphur dioxide, ozone, oxides of nitrogen, soiling index, and total reduced sulphur.

Another new air quality monitoring station, opened this year at the Acidic Precipitation in Ontario (APIOS) site at High Falls, to the west of Sudbury, played host to the public during the year.

Among the visitors were a group of European scientists, who toured the site as part of their introduction to the work of the Ministry.

The answer was blowing in the wind

The odors blew in from the east, and in from the west, but the City of Cornwall just didn't know where to find them.

Emissions from a paper mill to the west of the city include mercaptans (which smell like skunk) and hydrogen sulphide (H_2S–which smells like rotten eggs), and a cellulose plant to the east of the city produces similar rancid smells.

To add to the dilemma, the burning process used to reduce these emissions results, because of added oxygen, in the release of sulphur dioxide (SO_2) into the air.

Monitoring the mercaptans, H_2S and SO_2 proved to be a real problem because it was almost impossible to decide which of the two plants was producing a particular batch of bad smells at any given moment.

This year, however, an ingenious answer to the problem was discovered by the laboratory of the Ministry's Southeastern Region.

The laboratory used three strategically-placed air monitoring stations, a small meteorological station (which measures wind speed and direction) and a specially-written computer program to solve the mystery.

By collating information collected from the stations, monitoring personnel can now trace the odors to the specific plant that is producing them.

The new method will also be useful in other situations where data from continuously operating monitoring equipment can be analysed.

The Ministry, in fact, is considering applying the technique to southern Ontario, where air emissions might be more definitely assigned to areas such as Detroit, Windsor, Sarnia, or Metro Toronto.

Advance planning aids acid lake identification

In 1983-84, 50 lakes and streams in the Ministry's Northwestern Region were evaluated for sensitivity to acid rain.

Five hundred other lakes in the region have been tested for acid rain damage since 1979.

Three acidified lakes were identified in Pukaskwa National Park, but at the moment it remains uncertain if the damage was from acid rain, or from natural causes.

Natural damage could occur, for example, from organic acids caused by the breakdown of organic matter such as decomposing leaves in the forests.

In any case, the sulphate levels of lakes have been found to increase as one moves east from the lakes near the Manitoba border where sampling took place.

Interest in the Northwestern Region has increased since the creation of Ontario Hydro's coal-fired generating station at Marmion Lake, near Atikokan.

Area residents, and others, were concerned about the station's possible effect on nearby Quetico Provincial Park and the Boundary Waters Canoe Area in Minnesota.

Now that the generating station is being built to produce only 200 megawatts of electricity, rather than the 800 Mw originally announced, concern has diminished.

Nevertheless, the Ministry is planning to monitor the station for at least three years after it goes into operation, which will probably be in the fall of 1985.

Advance planning is necessary because the main operation of this generating station will be during the winter, when SO_2 from the plant is deposited and builds up on the ice.

Getting water samples can be difficult at the best of times in these remote areas, but particularly so at the critical moment of spring break-up, when the highest concentrations of SO_2 will enter the water and could cause severe short-term acidification.

During this period it is virtually impossible to land by plane on the ice to collect samples, and the Ministry is now developing other ways of reaching sites that are located far from roads.

Regional consultation increases

Regional offices play an important role in providing an on-the-scene viewpoint on proposals submitted to the Ministry's head office or other agencies for approval.

The Ministry's Central Region serves as an illustration of the sort of submissions that may be received by a region for comment during a year.

Since the introduction of a new Planning Act for Ontario, the number of proposals circulated to the region for preliminary comment has been on the increase.

In 1983-84, the region reviewed 261 plans of subdivisions or proposals for condominiums, 237 Official Plans and Official Plan Amendments, and 31 submissions related to the Niagara Escarpment planning area and the Parkway Belt.

Sixty-three proposals under the Environmental Assessment Act were also reviewed by the region during the year.

Shedding new light on sewage purification

Normally, effluents from sewage plants are chlorinated to treat them. The Ministry, however, is also developing other treatment methods.

This year, scientists at the Ministry-owned Tillsonburg treatment plant have come up with an experiment that's bound to shed new light on the situation.

Researchers are using ultraviolet light (which kills microbes in the effluent) to treat sewage at the plant.

The ultraviolet treatment is already known to be quite effective when used on effluent that is clear, but it remains uncertain just how much the effectiveness of the treatment is reduced when the effluent is murky or contains floating solids.

The Tillsonburg plant, located in the Southwestern Region, is particularly suited to the continuing experiments, since it actually consists of two separate facilities run side by side.

Thus one of the buildings can be operated in the normal way, using chlorine as the purifying agent, while the other is used to test the ultraviolet light treatment.

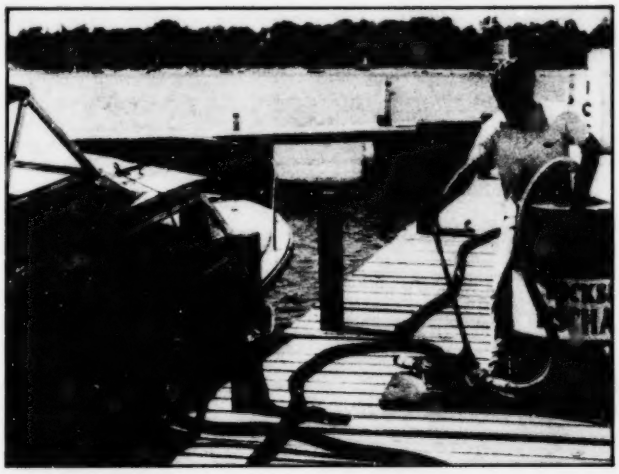
A computerized experiment was also begun at Tillsonburg this year to find the most

efficient and energy-saving way of running the entire operation.

Regional staff operate a number of sewage treatment and water supply plants in the Province, with Ministry-operated facilities serving a population of about 750,000 in the Southwestern Region and 550,000 in Central Region, to cite only two examples.

Sanitary sailors

Under Ontario's Boating and Marina Regulations it is illegal to discharge sewage from boats into the water; it must be pumped out at an official pump-out station.



In the West Central Region, 190 pleasure boats and 40 marinas were inspected this year to see if their sanitary arrangements conformed to Ministry requirements.

Only two boats were found to be in violation of the regulations.

Using carbon to kill contaminants

A $1 million pilot study using granulated activated carbon (GAC) to purify water was begun this year at the West Central Region's Niagara Falls water treatment plant.

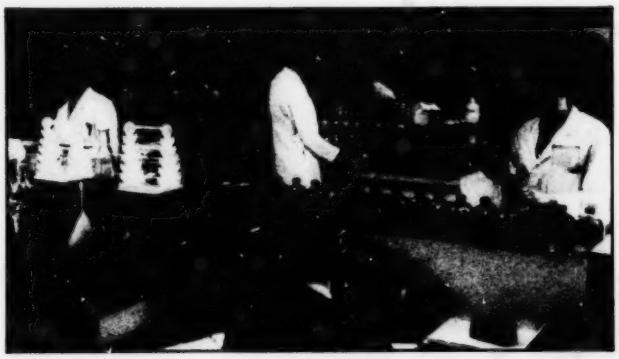
The study is to determine the efficiency of GAC in treating the drinking water.

The pilot plant essentially consists of several columns filled with GAC which allow the effects of various coagulants to be investigated, as well as the pH of the treated water.

(The pH scale, ranging from 0 to 14, is a measure of acidity and alkalinity with 7 neutral, and 0 and 14 the respective acid and alkaline extremes.)

The study will also help scientists determine the best thickness of the GAC bed needed to remove certain contaminants, the effects of water pressure on the bed, and a number of other relevant details.

The GAC-treated water will not, however, be mixed into the Niagara Falls drinking water distribution system.



The GAC study will take about three years to complete, and is the final stage of a three-stage research program dealing with drinking water treatment technology.

Analysis keeps labs busy

Regional laboratories in Thunder Bay, London and Kingston were kept busy during the year with chemical and microbiological analyses.

In the Northwestern Region there were about 140,000 analyses, an increase of more than 10 per cent due mainly to a special study of Lake Superior by the Ministry's Water Resources Branch.

The Kingston laboratory performed about 120,000 tests, a reduction of about six per cent, and the London laboratory carried out more than 220,000 tests during the year.

Environmental approval requests rise

The Environmental Approvals and Project Engineering Branch is responsible for reviewing and processing applications under the Environmental Protection and Ontario Water Resources Acts.

The branch also provides engineering and construction assistance to municipalities in developing water supply and sewage treatment plants, and promotes consideration of the environment in land use policies and programs.

The number of applications for approval under the Environmental Protection Act rose by 10 per cent during 1983-84, with 943 water and 1,213 sewage plant submissions handled by the branch.

Industrial plant applications totalled 755, a 20 per cent rise from last year, and there were 268 applications in connection with waste management sites and systems.

Sewage and water works construction

In order to aid in the construction of sewage and water works, the Ministry has developed a program that gives grants and subsidies to municipalities and administers construction contracts.

This year's highlights were:

—The Ministry administered 82 construction contracts, at a total capital cost of $68.3 million. Of this, $18.6 million, or more than 27 per cent, was provided in subsidies to municipalities.

—Direct grants of $46.5 million were made to municipalities for constructing municipally-owned water and sewage facilities.

—The Ministry gave $3.6 million in grants for the repair and renewal of private sewage and water systems in small communities. Such sewage systems are generally of the septic tank and tile bed variety. This program is a practical step to save money and time, by avoiding expensive large-scale water and sewage plants where they are not necessary.

—To help build municipally-owned water and sewage plants, $4.3 million was given in direct grants under the job creation program administered jointly by the Ministry and the Board of Industrial Leadership and Development (BILD).

—Grants of $10.3 million were given to help the construction of sewage facilities in the Great Lakes Basin. This was under the Canada-Ontario Agreement Sewerage Program (COASP), a joint federal-provincial effort.

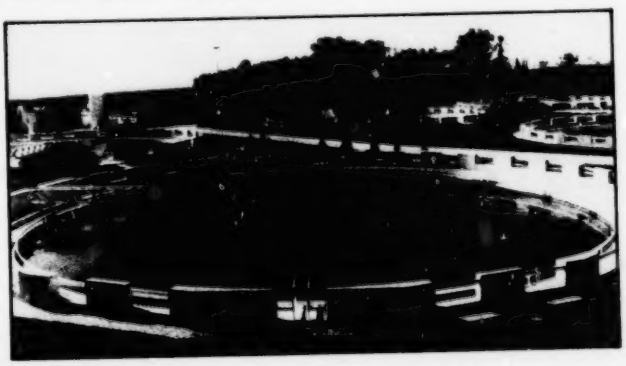
Locations of some of the above mentioned projects are: Keswick, Wasaga Beach, Belleville, Innisfil, Thunder Bay, Ignace, Parry Sound, Sudbury, North Bay, Timmins, Nakina, Longlac, Geraldton, White River and Hornepayne.

The works at Wasaga Beach are to aid the Ministry of Natural Resources' plans to develop the town as a high-profile recreational area.

York-Durham system nears completion

An expenditure this year of $18.8 million signalled the near-completion of the York-Durham sewage system.

The system is now completed except for the Aurora and Newmarket pumping stations, which were still under construction at year's end.



This system is more than 100 kilometers long and will eventually carry the wastes of 800,000 people.

The system runs southwards from Newmarket near Yonge Street, then eastwards through Markham, down to the Dufferin Creek sewage treatment plant at Pickering, on Lake Ontario.

Another branch runs from Woodbridge eastwards to link up with the main trunk line.

The York-Durham system replaces small sewage treatment plants on the Don, Humber, Rouge and Holland rivers, which will now be protected from pollution, and the phosphorus loadings to south Lake Simcoe will be reduced.

Development of the system has sparked a vigorous industrial, commercial, and residential growth in the serviced area north and east of Toronto.

Total costs for the system, including its Dufferin Creek plant, are now about $260 million, with the Dufferin Creek plant designed so that it can be progressively extended as the population demand increases.

The plant is computerized to provide instant data, so that its operations can be controlled from a central control panel.

In parallel with the sewage collection system, a 4-million gallon water supply system to serve the York Region is also largely completed.

The Ministry spent more than $600,000 this year on the York water system, and began design work on the main outstanding items, the Langstaff and Clark Avenue water mains.

Value engineering cuts costs

In its quest for value-for-money, the branch's Value Engineering Unit carries out cost analyses and suggests alternatives for water and sewage systems.

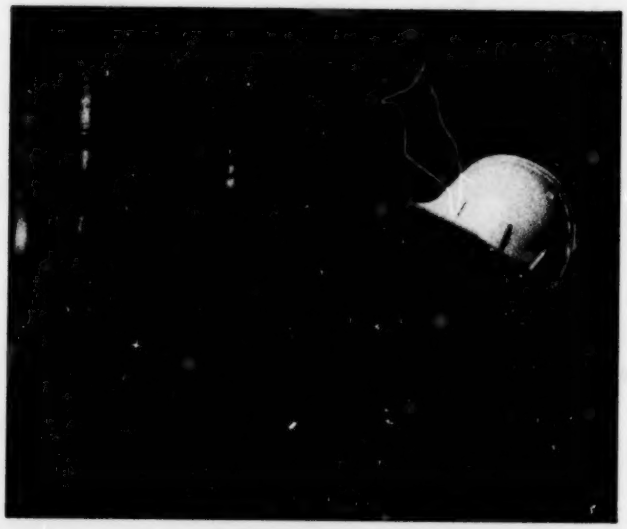
Among the 100 projects evaluated in 1983-84, the Aylmer sewage treatment plant, a municipal project, deserves special attention.

The unit's evaluation of the project resulted in advice on redesign that led to a saving of approximately $1.35 million, or about one-third of the original estimated cost of slightly more than $4 million.

Water storage tanks studied

Under contract to the Ministry, consulting engineers from Queen's University have been doing research this year on ways to improve the construction and repair of high-level municipal water storage tanks.

Special emphasis was placed on the study of tanks made of reinforced concrete.



Experts diagnose equipment ills

Technical experts of the Special Engineering, Design and Equipment Unit regularly visit sewage and water treatment plants to help solve problems that crop up with equipment such as pumps, diesel engines, and water meters.

The engineers, who also give advice on the design of new treatment plants, made 625 of these visits during 1983-84.

In addition, they worked with the Ministry of Transportation and Communications and the Municipal Engineers Association to prepare a new set of standards for the construction of municipal services in Ontario.

The research included studies on the way in which deterioration takes place, the protection from freezing of concrete tanks exposed to freeze-and-thaw conditions, the effects of ice expansion in the tanks, and a survey of protective coatings for both concrete and steel water tanks.

The research has led to some pioneering developments in the field of water storage tank repair.

An example, completed this year, featured steel reinforcing cables, set in grease inside protective plastic sleeves and wrapped around the outside of the cylindrical tank and tensioned.

Two-inch slabs of polystyrene insulation were installed on the outside to prevent the water in the tank from freezing, and steel siding was then added to keep the weather out.

Freezing water is a general problem with these tanks, and it was discovered that in some cases the expanding ice forms a "bridge" right across the inside of the tank, putting pressure on its walls.

Besides adding insulation, other ideas were considered to lessen the amount of freezing in the tanks.

Options studied included the warming of water by solar power, and using wind power to produce electricity to warm or stir the water.

Thus far, however, the polystyrene insulation has proven to be the best solution to the problem.

Tracking down noise

In 1983-84, the Noise Assessment Unit investigated complaints about operations that included a greenhouse (fans), race tracks, a railway yard, and snowmaking machines.

The unit also commented on proposals that included gravel pits and quarries, industrial plants, a Formula One auto racing track and a grand-prix motorcycle track.

The motorcycle racetrack proposal had an interesting twist, because the man who wanted to open the track submitted a report from a noise consultant, which was forwarded to the Ministry for comment.

Ministry staff were suspicious of the report and discovered that the track operator had "doctored" the end of it to make it conform completely with his own conclusions.

After detailed Ministry analysis the proposal was eventually approved, but with stringent conditions imposed.

"Red Mud" research aids sewage systems

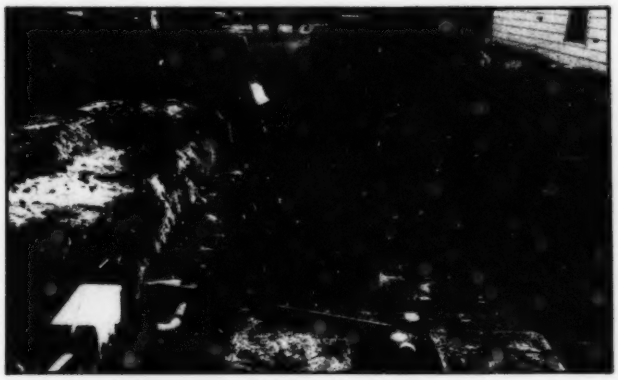
As a result of the completion this year of seven years of Ministry research, filter-type beds may be installed in private sewage systems that are too small for standard beds.

Private sewage systems usually consist of septic tanks and "tile" (leaching) beds, which are subsurface drainage systems that discharge below the ground, unlike municipal sewer systems which discharge into surface waters such as rivers or lakes.

In standard beds, the perforated distribution pipes are laid in gravel in individual trenches, but in the filter-type of bed the pipes are laid in a continuous bed of gravel, with a thick layer of selected sand underneath it.

The Ministry researchers found that by adding a layer containing "red mud" to the filter bed, they could achieve a great reduction of phosphorus.

"Red mud" is an inexpensive waste by-product of bauxite



purification which contains oxides of calcium, aluminum, and iron.

This method of reducing phosphorus is not normally necessary in Ontario, where the process by which the sewage passes through the leaching beds and is absorbed into the ground usually takes care of the problem.

Nevertheless, in jurisdictions that allow surface discharges, such as into ditches or water courses, the process will be very useful.

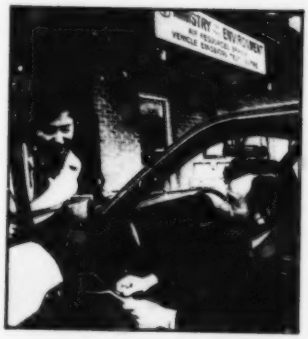
The system itself is unique, and has been patented by a company in the United States.

Negotiations with a U.S. company that will design and install the system under licence were nearing completion at year's end.

Environmental Planning Division

1983-84 Environmental planning highlights

- New mobile monitoring van drives researchers direct to sources of air pollution.
- Ministry and OPP combine forces to put the brakes on vehicle emissions.
- Report predicts farm crops increased by $23 million if ozone levels kept down.
- Water monitoring shows cleanup measures to be effective.
- Loquacious clams used to pinpoint pollution.
- $1 million spent on termite control.
- Ministry's laboratory output increased.
- Acid rain testing on the rise.
- Waste management policies and practices reviewed.
- PCB disposal facilities studied.
- More than $1 million spent on waste disposal.
- Recycling turns trash into cash.
- Comprehensive inventory of dangerous disposal sites completed.
- New Technology Assessment Section aids investigators.



Planning for the future

To paraphrase poet Robert Burns, "the best laid plans for mice and men," might serve as a lighthearted unofficial motto for the Ministry's Environmental Planning Division.

Unlike the aborted plans referred to by the great Scots bard, however, the Division's

"best laid plans," which have an effect on mice, men, and everything else to do with the environment, are put into practice across the Province.

The Division's six branches are responsible for developing plans, programs and policies, and providing technical and scientific support to regional operations.

The respective branches are Air Resources, Water Resources, Waste Management, Hazardous Contaminants and Standards, Environmental Assessment, and Laboratory Services and Applied Research.

Various units of the branches lend their planning, technical and scientific expertise to all of the Ministry's major programs and activities.

Special units and programs

In 1983-84, a special mobile survey and emergency response unit of the Air Resources Branch carried out 15 air quality surveys in industrial areas across the Province.

The unit also responded to two emergencies involving chemical spills, and developed and evaluated instruments to measure concentrations of non-routine air pollutants and organic vapors.

The branch also contains special units which worked on precipitation and air chemistry studies, participated in a joint Canada-United States study of long range transportation of airborne pollutants, and began work on an oxidants study in the Sarnia area during the year.

Evaluations were carried out of measurement methods of a variety of pollutants and recommendations made on funding of air pollution studies and research at Ontario universities.

Another special unit contributed to the development of a list of hazardous contaminants published in an environmental handbook.

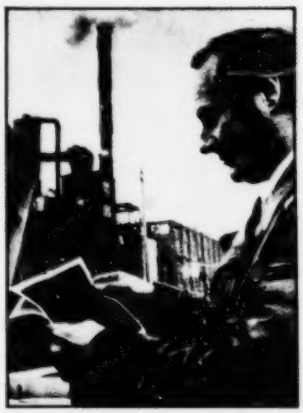
Measuring air quality

Guidelines and standards for pollutants in the air we breathe have become almost as necessary as the air itself.

In order to ensure that emission levels are being adhered to, the Air Resources Branch operates a network of 1,250 instruments in 125 locations across Ontario.

In 1983-84, this network produced about 3 million measurements which were processed by computer. The level of 12 contaminants or classes of contaminants, as well as meteorological factors, were measured.

The Ontario Air Pollution Index was monitored and publicized daily, and a new Ontario Air Quality Index developed for implementation in 20 cities.



Smoking out pollution

The day may appear to be clean and clear, but smoke from sources ranging from giant industrial smokestacks to the tiny stovepipes of wood-burning stoves will still be pouring pollution into the atmosphere.

In order to control this kind of airborne pollution, Ministry air resources and waste management personnel have increasingly pooled their research on the incineration of hazardous materials in 1983-84.

One of this year's major projects was the co-ordination of a test program at the Hamilton-Wentworth Region's Solid Waste Reduction Unit.

Following a series of combustion tests designed to establish satisfactory burning conditions, 13 further tests were carried out under a variety of operating conditions and analyses made for dioxins, furans, and other pollutants.

Test results were used to determine acceptable conditions for incinerator operation at the facility.

The branch assisted regional offices with expertise regarding emission control technology and co-operated with industry in a study of asphalt plants.

Of particular importance this year were studies of the problems of particulate matter from industries in the Beachville area and the control of sulphur dioxide from Algoma Steel at Wawa.

The branch collaborated with the California Air Resources and Waste Management boards in carrying out tests of dioxin and furan emissions and proposed control methods for an incinerator in Japan.

Studies of the combustion of wood, wood by-products, and the use of wood stoves were also initiated with the Canadian Standards Association this year.

Going straight to the sources

During the fiscal year, the Air Resources Branch commissioned a new monitoring vehicle that can now drive researchers directly to the source, to instantly measure levels of pollutants discharged into the atmosphere.

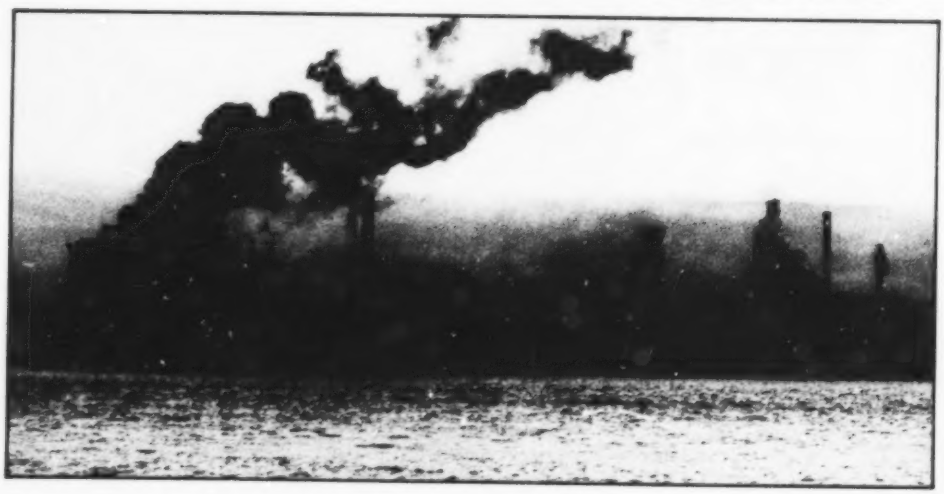
Called the Stationary Source Emission Monitoring Unit (SSEMU), the mobile monitoring van became fully operational in July, 1983, and was used to conduct emission measurements at Riverdale Hospital, Toronto, and at Stelco, Nanticoke.

Source measurement programs were also initiated to evaluate the monitoring of total reduced sulphur emissions from kraft paper mills.

Putting the brakes on vehicle emissions

With the number of vehicles on Ontario's roads growing each year, monitoring automobile-created air pollutants such as nitrogen oxide, carbon monoxide and hydrocarbon emissions is of prime importance to the Air Resources Branch.

This year branch investigators checked 3,758 cars for emission controls and exhaust emission



levels, and 1,778 (or 47 per cent) of cars tested failed to meet Ontario standards.

Drivers were requested to have the problems corrected. Twelve per cent (or 445 cars) had faulty pollution control equipment and operators received violation notices.

A total of 2,855 cars were inspected at used car dealerships, with 77 violation notices issued, and visits made to 73 muffler shops to ensure proper replacement of catalytic mufflers.

In addition, two inspectors from the branch accompanied Ontario Provincial Police highway patrols which resulted in 385 diesel trucks being stopped for excessive smoke emissions.

Three-hundred and fifty-six charges and 29 warnings were issued, and 311 operators convicted and fined as a result of these patrols.

Analysing Ontario's crops

In 1983-84, air resources staff conducted examinations of soil and vegetation in the vicinity of 106 industrial and other sources of emissions.

The branch investigated 173 complaints about possible damage to vegetation as a result of air pollution including acid rain, and one-third of these problems were found to be caused by contamination.

Several of the complaints involved possible economic loss to farmers, and reports were made to a negotiation board in the event of damage claims being made.

Staff conducted extensive surveys to determine the degree of ozone injury to white bean, potato and tomato crops throughout southwestern Ontario.

The surveys determined that oxidant injury to crops was less severe than in 1982.

During the year a report was issued based on several years of observation of atmospheric levels of ozone and related crop damage.

The report estimated that farmers could increase crop production amounting to as much as $23 million a year if ozone levels are kept within Ontario standards.

Extensive studies on forest crops and soils were also carried out as part of the Province's Acidic Precipitation in Ontario Study (APIOS).

Watching the waters

Like the air we breathe, the waters we drink, bathe and fish in are in constant need of protection.

Just as constantly, the Ministry's Water Resources Branch monitors those waters to establish guidelines that ensure the water is safe for drinking, aquatic life, and recreational use.

Monitoring of the Great Lakes has shown that remedial measures are having a positive effect.

Three examples are:

Monitoring at Thunder Bay during 1983-84 showed that efforts to clean up pulp and paper mills in the area have resulted in a decrease in BOD

(biochemical oxygen demand) loadings, and bacterial contamination has also decreased because of improvements on municipal waste discharges.

Reduced levels of phenols in the St. Clair River this year are attributed to an extended outfall at the Township Ditch and improved operations at Polysar and Dow Chemical plants.

An investigation of trace contaminant distribution and aquatic life in Lake St. Clair also revealed that mercury levels have declined in sediment and the diversity of aquatic life on the lake bottom has improved this year.

Ministry water researchers, however, have ways of making the real close-mouthed little mollusks "talk" until they sing like canaries about sources of aquatic pollution.

Simply put, the clams are collected by divers and placed in wire cages not unlike a small supermarket shopping basket, and lowered into the water to be tested at a depth of about six feet.

Since clams live in sediment, they collect and accumulate measurable quantities of chemicals and pollutants along with their natural nourishment.

Biological monitoring using freshwater clams was carried out this year in the St. Clair and Detroit rivers.

International waters

The Niagara River has been identified as a potential source of contamination in Lake Ontario, and most of this contamination comes from the United States' side.

Three major studies were undertaken in the river this year to identify sources of contamination, determine changes in lake bottom aquatic life since 1967, and identify locally affected areas.

Loquacious clams pinpoint pollution

As any experienced investigator can tell you, "silent as a clam," and to "clam up," are phrases used to describe a witness who won't give out any information.

After several weeks the clams are again collected and subjected to a variety of laboratory tests which reveal the levels of substances they have absorbed from untreated water.

Further and more detailed testing may even be used to pinpoint sources of pollution.

Staff also provided assistance to the international Niagara River Toxics Committee in its report on U.S. and Canadian sources of pollution, and made recommendations for their control.

This year, total phosphorus loading estimates from 63 major Canadian tributaries to the Great Lakes were summarized for the period going back to fiscal 1982-83.

The summaries were issued to the International Joint Commission (IJC) for inclusion in the Water Quality Board Report.

Watershed studies completed

Water resources personnel completed a number of river basin studies during the fiscal year.

The studies were aimed at assembling data on water quality, aquatic plants and algae, hydrology, and pollutant loadings from sewage plants, industrial discharges and agricultural areas.

The three-year Stratford-Avon project was completed and demonstration remedial-measures projects initiated to protect streams from urban and rural sources of pollution.

The four-year Rideau River Stormwater Management Study, conducted in co-operation with Environment Canada, the municipality of Ottawa-Carleton, and the cities of Ottawa and Nepean, was also completed.

Its purpose was to evaluate stormwater runoff loadings into the river from urban areas.

Reports were also completed on water resources inventories of the Credit River, portions of the Humber and Don rivers, and on the basins of Etobicoke and Mimico creeks.

Groundwater management

Licences were issued to 453 well-drilling and boring contractors by water resources staff during the year.

Groundwater surveys and reports were completed for two municipalities, two well-performance inspections carried out, and four test-drilling projects were supervised during the same period.

Geophysical investigations to help solve contamination problems at 20 locations were instituted, and staff assisted in solving well-interference problems at eight capital works projects.

Ten groundwater susceptibility maps and one groundwater probability map were published, and the impact of acid rain on groundwater was studied as part of the Ministry's Acidic Precipitation in Ontario Study (APIOS).

Setting standards

An important part of the Ministry's management of toxic substances is the development of standards for hazardous contaminants that affect air, water, soil, sediment and biological organisms.

In order to do this, information on the contaminants is synthesized into scientific documents which serve as the basis for assessing risk and control factors.

This year, for example, a major review of micro-organisms in recreational waters was completed and work begun on a comprehensive study of dioxins and dibenzofurans.

At the Ministry's request, the first comprehensive survey of the use and discharge of chemicals in Ontario was completed by the Canadian Chemical Producers' Association.

This document is now being used by Ministry staff to prepare exposure estimates of chemicals in the environment.

The Hazardous Contaminants and Standards Branch of the Ministry also shares its own expertise with industry, government, the public, and various international pollution control agencies.

Controlling pesky pesticides

Another key element of the management of hazardous contaminants is the control of pesticides, including their distribution, sale, storage and use.

This is done by regulating and educating the pesticides industry, applicators, farmers, municipalities and the public.

In 1983-84, 2,380 examinations on pesticides use were held, and licences issued for 8,644 exterminators, 1,277 operators and 3,392 vendors.

The Ministry also issued 1,983 permits for the use of restricted products on land, 412 permits for the application of pesticides to water, and 191 permits for exterminations in structures.

The Ministry approved grants for chemical treatments and structural alterations to control termites for 281 householders in 14 municipalities.

The total amount of these grants in 1983-84 was $313,268.

A further $686,932 was given directly to 19 municipalities under new agreements to provide grants at the municipal level.

These one-time grants are intended to reduce the existing backlog of applications by individual home-owners.

Two major projects relating to biological agents were also begun in 1983-84.

The projects were a three-year study to monitor loading of the herbicide atrazine on a small agricultural watershed, and a study to determine the extent and impact of the insecticide aldicarb on groundwater in potato-growing areas of Ontario.

Environmental assessments

Ontario's Environmental Assessment Act promotes environmental safety in the planning and development of a broad spectrum of activities ranging from waste management to municipal transit and roads.

The Act itself is gaining recognition well beyond the borders of Ontario. Representatives of the Italian, Norwegian and Polish governments have visited the Ministry to study its provisions.

The visitors learned that when an environmental assessment is formally submitted to the Minister, Environmental Assessment Branch staff co-ordinate a governmental review of the proposed undertaking.

Staff members consult with proponents, government reviewers and members of the public, advising them on the requirements of the Act.

In 1983-84, staff worked closely with waste management personnel in co-ordinating environmental assessment (EA) requirements for the Blueprint for Waste Management and area waste master plans.

During the year six EAs relating to waste management were submitted and four approved.

Staff were involved in consultation on 29 other waste-related projects, with two exemption orders processed.

A hearing was held under the Consolidated Hearings Act on a proposed Victoria Hospital Energy From Waste facility in London, which the Board approved and Cabinet confirmed.

Three EAs on municipal activities were submitted this year, and another approved.

Nineteen exemption orders for municipal activities were processed, and consultations carried out on six other municipal projects.

Three Class Environmental Assessments were carried out on projects involving municipal water and sewage, municipal transit, and municipal roads.

A Class Environmental Assessment requires only a single approval for activities of a similar nature carried out over an extended period of time.

Pending approval of the Class EA for water and sewage activities, a number of small municipal projects were exempted.

Staff also assisted the Ministry of Transportation and Communications and Ontario Hydro with Class EAs relating to provincial roads and electric power facilities, and the Ministry of Natural Resources in developing an EA for forest management.

Laboratory output increased

Increases in productivity have been recorded by the Ministry's Laboratory Services and Applied Research Branch this year.

The increased productivity of various groups within the branch is attributed to improved equipment and computerized data handling.

The major activity of the branch's central laboratory in Toronto and regional labs in London, Kingston, and Thunder Bay is the production of analytical data in support of Ministry programs.

The general increase in productivity this year was achieved despite the fact that more complex analysis, lower limits of detection, and a wider range of tests have combined to increase the time involved in each analysis.

Quality control samples are part of all laboratory testing procedures.

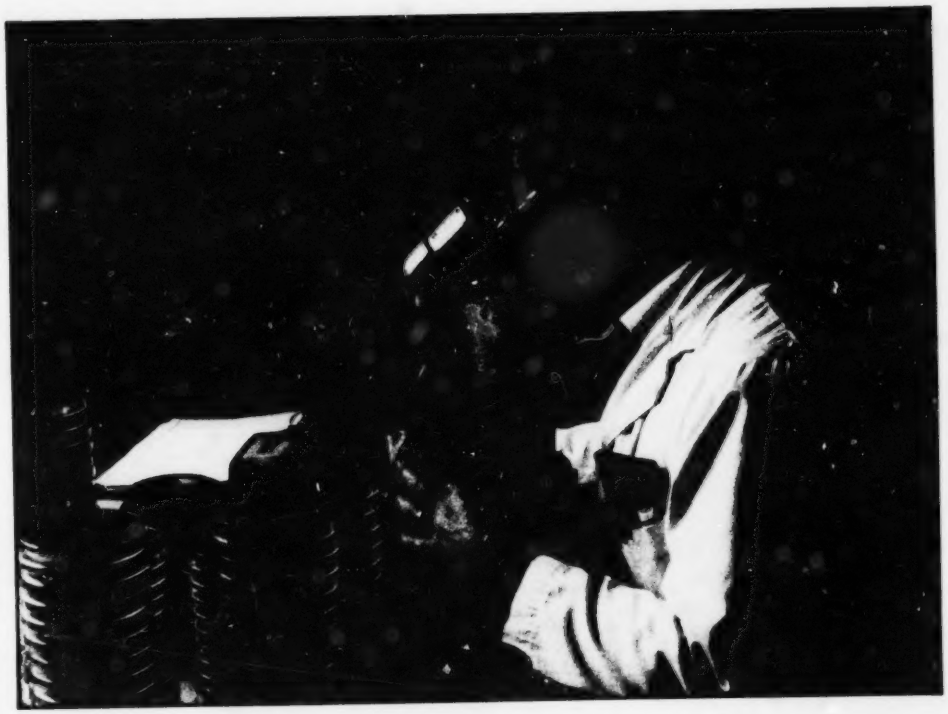
During 1983-84, the branch carried out more than 20 special inter-laboratory comparisons as part of its quality control program.

Table 1 shows this year's test load summary as compared to last year's.

TABLE 1

Laboratory Testload Summary (Tests/1000)

	CHEMISTRY		MICROBIOLOGY		TOTAL	
	82/83	83/84	82/83	83/84	82/83	83/84
REGIONAL LABS						
London	187	170	57	54	244	224
Thunder Bay	93	97	32	42	125	138
Kingston	105	99	64	54	169	153
TOTAL	385	366	153	150	538	515
Central Lab						
Inorganic Trace Contaminants	450	533			450	533
Water Quality	786	870			786	870
Pesticides (Scans)	11	18			11	18
Organic Trace Contaminants	107	28			107	28
Microbiology			136	148	136	148
TOTAL	1354	1449	136	148	1490	1597
Total Regional and Central Labs	1739	1815	289	298	2028	2112



Acid rain loads labs

As in 1982-83, the Acidic Precipitation in Ontario Study (APIOS) was the largest single program requiring the use of laboratory services during 1983-84.

APIOS testing comprised 29 per cent of the laboratory workload and also accounted for its largest increase, 27 per cent, or more than 100,000 tests.

The additional workload was due to increased activity at regional sites devoted to APIOS investigations, lake liming projects, and growing concern about possible forest decline.

A 42 per cent increase in tests related to solid and liquid wastes this year (or 37,000 tests in all) reflects increased Ministry attention to those problems.

As always, the Ministry's regional operations were the branch's largest client, submitting 64 per cent of the total tests.

Tests submitted by the regions were up by 110,000 this year, an overall eight per cent increase from 1982-83 which also represents a 15 per cent increase to the Central Laboratory's total workload.

Almost 95 per cent of the Central Laboratory sample and test load originated this year from six programs and 12 subtasks. They are listed in Table 2.

Intricate instruments implemented

In order to handle the two million tests completed each year, the Ministry's Central Laboratory uses a centralized computer system called the Laboratory Information System (LIS).

This year, work began to implement the transfer of computerized information from laboratory instruments directly into the LIS.

Called Direct Computer Input (DCI) the process is designed to meet the laboratory's commitment to make full use of the LIS by placing information on all tests and programs in the system.

TABLE 2
Workload by Major Program: Central Laboratory 1983-84

PROGRAM/SUBTASK	# OF TESTS/ITEMS TOTAL		% TOTAL	
Water Management	419		26	
Great Lakes		81		5
Inland Water Quality		124		8
Surface/Water Groundwater		214		13
Industrial Assessment	38		2	
All		38		2
Solid/Liquid Waste	37		2	
All		37		2
Municipal Management	353		23	
Wastewater Treatment		124		8
Drinking Water		188		12
Complaints		41		3
Acidic Precipitation in Ontario Study	475		29	
Air		82		5
Water		261		16
Terrestrial		132		8
Air Assessment	202		13	
All		202		13
	1524	1524	95	95

Along with the newly-sophisticated information system, a number of equally intricate instruments for analysis have been installed by the branch this year.

The Water Quality Section acquired a new transmission scanning electron microscope with x-ray diffraction that will expand the laboratory's capabilities in the area of particle analysis.

A sequential inductively coupled plasma (icp) spectrometer was purchased which allows an operator to quickly select and confirm an analysis of more than 60 elements.

Also operational this year is an Elan icp-ms, which is essentially a marriage between an icp source and a mass spectrometer which can determine almost any element in the periodic table to parts per billion.

Testing the air for TOX And POX

A number of new methods of analysing atmospheric pollutants were developed this year, including analytical protocols for TOX (Total Organic Halogens) and POX (Purgeable Organic Halogens) in the air we breathe.

Energy dispersive x-ray fluorescence methods are also now operational for the metals analysis of Teflon filters used to measure inhalable and non-inhalable particulate matter.

The first applications of high resolution mass spectrometry were directed to dioxin analysis this year, and progress made in the development of models to predict the impact of airborne pollutants on various chemicals.

A mass spectrometer, incidentally, is used to separate and indentify compounds according to their molecular weight, or mass.

Water purification studies

Studies were carried out by laboratory services in a number of fields involving hazardous contaminants during 1983-84.

The studies included a pilot-plant study in Niagara Falls to purify drinking water, a new water treatment method, and a study of asbestos corrosion in cement pipes.

Other studies this year included development of a protocol for the routine analysis of hazardous contaminants in wastewater, evaluation of prediction methods for hazardous contaminants in municipal sewage, and the removal of hazardous organic contaminants from sludge.

Studies were also carried out to determine the lethal thresholds of pH and aluminum for Ontario fish.

Both field and laboratory experiments were completed which exposed young lake and brook trout to a range of hydrogen and aluminum concentrations.

Troubleshooting

Laboratory services also handle non-routine complaints and emergency samples that are part of special studies.

This year, for example, assistance was given to the Newmarket Medical Officer of Health in isolating the cause of a case of lead poisoning.

The cause, originally thought to be linked to the general atmosphere, was found to be coming from the house involved.

In addition, the branch provided advice to 11 municipalities on the full-scale adjustment of water plant processes for treatment improvement in 1983-84.

Defining and refining waste management

One of the principal environmental challenges of today's "throw-away society" is the effective management of waste.

In 1982, the Ministry initiated a comprehensive review of the Province's waste management policies and practices which culminated in the issuing of the Blueprint for Waste Management in Ontario, in June 1983.

During 1983-84, the Ministry's Waste Management Branch worked on refining a number of the initiatives suggested by the Blueprint, and by subsequent responses from industry, government and the public to its publication.

Among the initiatives worked on were the development of a comprehensive definition of hazardous waste, the creation of a new waste classification system, new provisions for the regulating of generators of special and controlled waste, and the extension of the current manifest system to include hazardous solid waste.

Protection against PCBs

During the fiscal year, the Ministry embarked on a program to introduce specific regulations for the destruction of all liquid and some solid polychlorinated biphenyls (PCBs) wastes in Ontario.

Portable destruction facilities like those pictured above are among the mobile technologies being considered as replacements for the Province's present fixed-storage installations.

Ontario currently stores PCBs and PCB-contaminated equipment because there are no PCB waste disposal facilities available in Canada.

PCBs are a family of clear, colorless, oily liquids which are non-flammable and have a high electrical resistance.

They have been extensively used as electrical insulating fluids in capacitors and transformers, as heat transfer fluids, and in the formulation of sealants, caulkings, and coatings.

The sole North American producer in the United States ceased production in 1977.

Subsequent regulation in the U.S. and Canada restricted their use to in-service closed systems and prohibited their production, sale, or import.

The Ministry's discussion paper outlining tentative proposals for destruction regulations was published in February, 1983, and in the fall of that year a Task Force was formed to review and carry forward the proposals.

Consultations were held during the year with industry, municipalities, public interest groups, potential proponents of disposal facilities, and other interested parties.

Public information meetings with municipal councils and staff were also held in the 18 communities in Ontario where most in-service PCB and stored wastes are found.

Public hearings on the revised proposals for destruction of PCBs will be held under the Public Inquiries Act.

Radioactive activities

The Ministry takes an active role in monitoring the environment for low-level radioactive contaminants.

During the year Waste Management Branch staff reviewed data on the concentration of radionuclides in Ontario's air and water and provided radiation consulting services to other branches and regions.

Staff also worked closely with the radiation protection laboratory of the Ministry of Labour and maintained close links with federal radiation monitoring agencies.

As well, they joined with personnel from the Atomic Energy Control Board and Environment Canada on an interagency committee to review progress on high-level radioactive waste disposal.

Waste money well spent

In 1983-84, the Ministry awarded grants totalling $500,000 to municipalities for approved work on investigations, improvement, upgrading and closure of landfill sites.

The grants bring the total amount expended on this type of landfill management since 1978 to $3.2 million.

Additional grants totalling $435,000 were given to four companies and four organizations which serve 17 Ontario communities in the separation of wastes that can be recycled.

The source separation program has to date given grants of almost $1 million to establish and promote operations which now serve 15 municipalities and one million residents.

Many of the operations reported a 70 per cent participation by residents and indicated that more than 10 per cent of household wastes that otherwise would have gone to a landfill were diverted.

More than 17,000 tonnes of material, worth more than $1 million, were recycled during the year.

In addition, the Ministry contributed $250,000 this year towards the development of waste management master plans by regional municipalities, counties, districts and groups of municipalities.

The Ministry has been supporting this type of municipal planning since 1972, and provides both technical guidance and 50 per cent funding of waste planning study costs.

Turning trash into cash

A Waste Management Branch recycling project recovered more than 200 tonnes of paper from government offices and generated a revenue of $10,000 this year.

It was the fifth successive year for the recycling project, which involved about 14,000 employees in 50 Toronto-area buildings.

A Ministry-funded experiment on the use of fuel derived from refuse, which was conducted at the Brampton Brick Company this year, proved less conclusive.

Although the results of a similar study last year were promising, definite conclusions could not be drawn from this year's efforts and further tests will have to be made before the refuse-based fuel can turn a profit.

However, process changes proposed this year by the branch to improve the quality of compost used in parks, conservation areas and horticulture, are expected to improve its retail marketability.

Disposal site inventories

A comprehensive inventory of active waste disposal sites in Ontario was completed by the Waste Management Branch this year.

The computerized inventory provides data on existing disposal facilities which can be used as information for provincial and municipal land use planning and the establishment of new disposal sites.

The branch is also developing a computerized inventory of disposal sites closed prior to the passing of waste management legislation in 1970.

The branch also reports that good prices have been paid for magnetically separated ferrous (iron-containing) material which is used in food and beverage cans.

The cans contain 70 per cent of ferrous material.

The purpose of the study is to identify old sites which may pose a potential threat to the environment.

Remedial action has already been taken at sites where environmental problems have been identified.

About 200 out of 1,451 closed or abandoned municipal waste sites were studied by a consultant hired by the Ministry to determine the extent of potential environmental problems.

In cases where it was concluded that more work was required, municipalities are carrying out additional investigations.

Municipal guidelines

In 1982-83, the Ministry implemented guidelines on the beneficial use of sewage sludge on agricultural lands.

This year the guidelines were revised to reflect the latest technical knowledge on the subject.

The guidelines were revised by the branch with assistance from the Ontario Ministry of Agriculture and Food, the Ontario Federation of Agriculture, the Municipal Engineers' Association, and soil scientists from the University of Guelph.

A study completed last year on generation rates and migration patterns of landfill-generated gas was used this year to create guidelines on the development of land on and adjacent to waste disposal sites.

A survey of hospitals and institutions generating pathological waste was begun this year, and methods of handling and disposing of the wastes were studied.

As a result, Ministry guidelines are being revised to include the sterilization of infectious wastes by pressure and heat processes.

Looking beyond Ontario's borders

In 1983-84, a new Technology Assessment Section was added to the Waste Management Branch to monitor advances in waste research and technology created outside of Ontario.

The section is responsible for identifying and assessing new innovations in the areas of waste processing, destruction technology, landfill disposal, and waste site evaluation.

The section then determines the applicability of such new developments to Ontario conditions and informs the public about their potential for the Province.

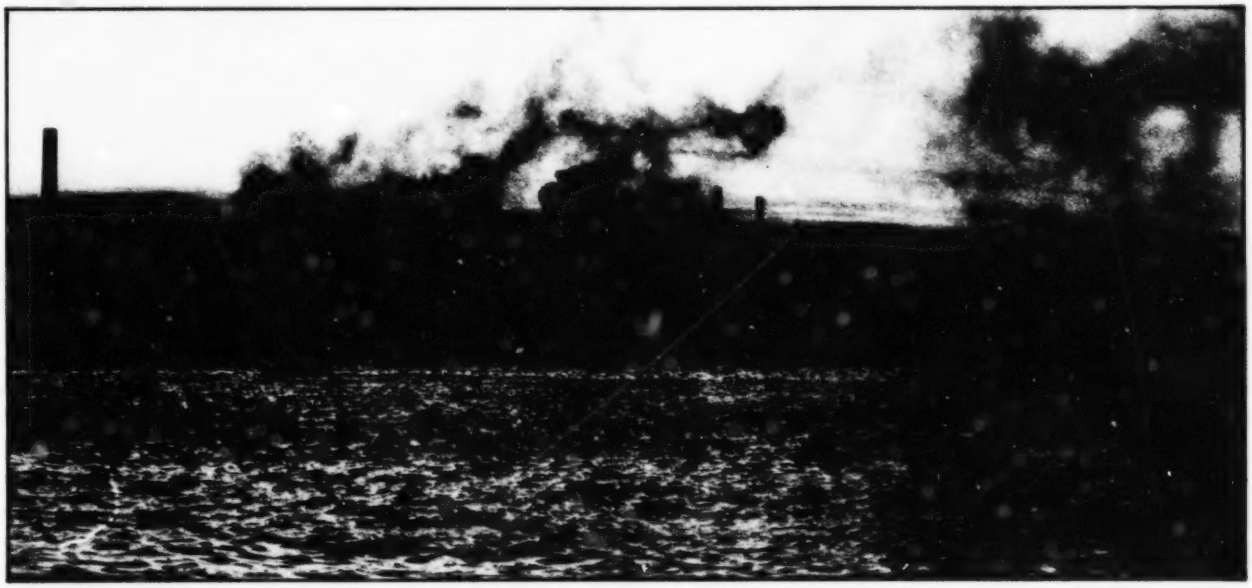
The section also plays a leading role in investigating waste sites where environmental problems have been identified.

This year the new section provided support to investigations of problem waste sites, analysed priority sites in the branch's inventory, and looked into the design of landfill liners and covers, leachate treatment, and the destruction of polychlorinated biphenyls (PCBs).

Intergovernmental Relations and Strategic Projects Division

1983-84 Intergovernmental relations and strategic projects highlights

- Ne international air pollution agreements signed.
- Ontario given right to intervene in U.S. court case.
- Mathematical models for analysing air pollution improved.
- New endangered lakes identified in Ontario.
- Northern lakes bombed back to life.
- First fully automated acidic precipitation facility in North America opened.
- Acid rain-related death of maple trees probed.
- Canadian sulphur dioxide abatement measures fixed by federal government and seven provinces.



Agreements negotiated and revised

Co-operation between governments is essential to the protection of the environment. An important factor in developing that co-operation is the signing of joint agreements to fight pollution.

The Intergovernmental Relations Office, responsible for co-ordinating the Ministry's efforts to resolve environmental problems with other jurisdictions, has negotiated and revised a number of important national and international agreements during the fiscal year.

Canada, for example, does not have a full bilateral agreement on air pollution control with the United States government.

The Ministry, however, began negotiations on Memoranda of Understanding on transboundary air pollution control with the state of Michigan.

The accord with Michigan will replace an earlier arrangement between the state and Province affecting sources of air pollution in the southeastern Ontario-southeastern Michigan area.

During the year, Memoranda of Understanding to combat acid rain were also signed with the states of Minnesota and New York.

In this country, negotiations were begun for revision of the Canada-Ontario Accord for the Protection and Enhancement of Environmental Quality. Discussions held with the Province of Quebec led to the development of a draft environmental accord.

Great Lakes agreement

New measures for the control of toxic substances and pollution from agriculture in the Great Lakes area have been developed as a result of Ontario's participation in a joint agreement with the United States government.

The development of the control programs for nonpoint pollution from agriculture was begun in response to the Province's participation in the 1983 Phosphorus Control Supplement to the Canada-United States Agreement on Great Lakes Water Quality.

The controls were developed by the Ministry in accordance with our own Canada-Ontario Agreement on Great Lakes Water Quality, which reflects the Canada-U.S. agreement and provides the framework for Canadian pollution control in the Great Lakes Drainage Area.

This important and wide-ranging agreement between the Province and Ottawa also serves as the vehicle for federal-provincial financing of sewage construction, phosphorus control, and all surveillance activities in the Great Lakes area.

International co-operation

International, as well as national meetings on the problems of pollution play a prominent part in the work of the Intergovernmental Relations Office.

During the past year, the office participated in an advisory capacity with the International Joint Commission's Water Quality Board and represented Ontario at Commission Meetings in Washington, Indianapolis and Ottawa.

Niagara River cleanup

Cleanup recommendations for several chemical waste sites in New York State have been made to American authorities as a result of hydrogeological evaluations made on the sites this year by the Ministry's Niagara River Improvement Team (NRIT).

The NRIT co-ordinates Ontario's efforts to reduce the discharge of contaminants into the river from both Canadian and United States sources. Since about 90 per cent of the contamination comes from the U.S. side of the river, the team is in continuous contact with state and federal agencies to press for corrective action.

The evaluations include assessments made of Occidental Chemical's Niagara plant site, and the 102nd street sites.

Ontario intervenes

A U.S. Federal Court judge has ruled that Ontario has the right to intervene in a court case involving Occidental Chemical's contaminated S-Area site.

The February, 1984, ruling stems from a request originally made by the Ministry in June, 1983. It gives the Province the right to formally challenge proposed cleanup plans for the site, which the Niagara River Improvement Team argues are inadequate.

The NRIT also reviews and challenges applications for new landfill sites. In June, 1983, the team approached the New York State Department of Environmental Conservation in connection with an application by SCA Chemical Services Incorporated to expand its hazardous waste landfill capacity at Model City, near Lewiston, N.Y.

Negotiations resulted in the company's agreeing to a significantly more extensive subsurface monitoring program for the site than had been originally proposed.

The monitoring will now continue both during and after the active life of the Model City landfill site.

U.S. permits challenged

Throughout the year, the NRIT continued its analysis of permits issued by New York State for industrial and municipal discharges.

Comments and suggestions for changes were regularly submitted to the state's Department of Environmental Conservation.

In the case of a permit for the Niagara Falls Wastewater Treatment Plant, however, Ontario is prepared to go even further. The permit is being challenged by a group of local industries as being too strict.

The Province, on the other hand, is seeking to take part in the state court proceedings to argue that no lessening of the permit's requirements should be allowed.

In addition, the team played a major role in the work of the international Niagara River Toxics Committee in preparing its report on contaminant loadings into the river.

Indexing pollution

During 1983-84, Ontario's acid rain program, the Acidic Precipitation in Ontario Study (APIOS) made major improvements to two mathematical models for analysing the long-range transport of atmospheric pollutants.

The models, developed by the Ministry to calculate how much of the acid rain falling in any particular place comes from any given source, are also being adopted by U.S. environmental agencies.

Under a co-operative agreement signed this year with the State of Minnesota, copies of both these atmospheric models were transferred to the Minnesota Air Pollution Control Commission.

An agreement with the State of New York resulted in a similar transfer to that state's Department of Environmental Conservation.

Work also continued this year in developing a comprehensive sulphur dioxide and oxides of nitrogen emissions inventory for eastern North America. This information is essential in planning cutbacks of acid gas emissions.

Acidified lakes

An extensive APIOS survey of lakes in Ontario identified a number of acidified lakes in the Province during 1983-84.

The survey, carried out in co-operation with the Ministry of Natural Resources, is designed to identify the number of lakes in Ontario that are at risk due to acid rain.

A sampling of more than 4,000 lakes in the Province for their sensitivity to acidic deposition has revealed that the majority of the acidified lakes are within 50 to 100 kilometers of Sudbury.

However, a number of acidified lakes were identified in other areas of the Province, including Algonquin Park, Muskoka-Haliburton, Algoma and Parry Sound.

Bombing lakes back to life

When a twin-engined Canso aircraft skims over a northern lake and drops a load of limestone that hits the water like a bomb, the fight against pollution begins to look like all-out warfare.

Actually, this kind of lake neutralization by liming is a measure to delay or reduce the effects of acidification.

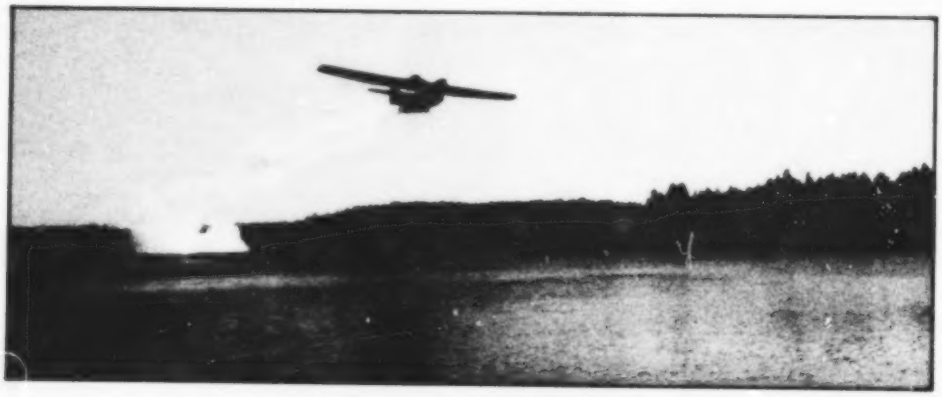
Faced with the fact that abatement programs may take anywhere from five to 15 years to solve the problems of acid rain, the Ministry is exploring such interim measures of protecting or rehabilitating a limited number of lakes.

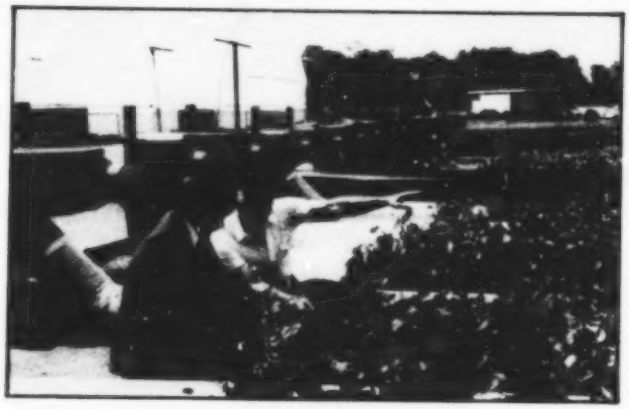
During 1983-84, Bowland Lake, an acid lake 70 kilometers north of Sudbury, was neutralized and the pH was raised from about 5.1 to approximately 6.8. After the operation the lake was stocked with yearling and adult Lake Trout.

Monitoring of Bowland Lake will continue.

In 1984, Trout Lake near Parry Sound was limed with 150 tonnes of finely powdered limestone. The lake still has Lake Trout, but acidic deposition was causing a stress on the population.

The experiment is designed to evaluate the effectiveness of liming as a protective measure.





It's raining inside!

In August, 1984, Environment Minister Andy Brandt officially opened a $400,000 mobile rain exclusion canopy system that will explore the effects of acid rain on Ontario's field crops.

The system, located at the Ministry's phytotoxicology laboratory in Brampton, is the first fully automated acidic precipitation facility in North America and is part of the Acidic Precipitation in Ontario Study (APIOS).

The innovative new system features three large mobile canopies, 64 feet by 30 feet, each set on tracks 150 feet long.

Every time it rains the canopies roll into place to cover test crops from natural rainfall. Under the canopy, acid rain with different concentrations can be applied.

In this way, the test crops are exposed to identical growing conditions, with only the chemistry of the rain subject to variation. This system, which will be fully operational in 1984-85, permits researchers to make more accurate assessments of the effects of acid rain on important agricultural species, including soybeans and corn.

The system, which combines the best features of systems currently operating in the United States, also has a blown-air component that protects the crops from dust particles and other forms of airborne pollution gases when they are not covered by the canopies.

Saving the trees

In the spring of 1984, a sizeable number of maple syrup producers throughout southern Ontario became concerned about the increasing number of maple trees that were declining, deteriorating and ultimately dying in their woodlots.

They complained to the Province and a team of scientists and specialists involved in the Ministry's acid rain research program (APIOS) was formed to investigate the causes of what became known as the Maple Dieback Syndrome.

Maple dieback is a complicated, puzzling problem that's been around since 1952, when it was first reported in Ontario.

It's complicated by the fact that the sugar maple is a unique species that doesn't adapt easily to modern times and is susceptible to a number of stresses because of its shallow root system.

Factors such as roots covered by pavement, excavations, winter salt splashed on roadside trees and salt runoff along roads can result in branch dieback due to stress.

Root rot occurs on stressed trees and branch dieback progresses down the tree, ultimately killing it.

The role acid rain plays in the killing of maple trees will be determined by the continuing Ministry study, through analysis of woodlot samples and a thorough historical overview of the plots tested.

Results of the maple dieback study are expected to become available in 1985.

International research

Acid rain is an international problem, and Ontario is also involved in acid rain research on an international level.

During 1983-84 Canada and the United States established a special committee to exchange scientific information and to set up joint research projects.

In addition, Ontario's APIOS researchers are involved in a number of joint projects with several European nations.

Ontario was also represented at the Canada-Europe Ministers Conference in Ottawa on March 20-21, 1984, at which nine European nations declared their intentions of reducing sulphur dioxide emissions by 30 per cent by 1993.

Who'll stop the rain?

Since it's been reliably estimated that anywhere from 50 to 70 per cent of acid rain fallout on Ontario comes from sources in the United States, it is essential that the U.S. match Canadian efforts at abatement.

On March 6, 1984, federal and eastern provincial ministers of the environment took a major step in implementing our abatement measures by agreeing on a sulphur dioxide emissions cap of 2.3 million tonnes to be imposed by 1994.

This represents a reduction of 50 per cent from 1980 levels.

The overall Canadian target is to reduce deposition in sensitive areas of eastern Canada to 20 kilograms of sulphate per

hectare (or 18 pounds per acre per year) which is believed sufficient to protect most surface waters sensitive to acid rain.

Precise allocations of the reductions necessary to achieve this emissions cap are currently being developed by the federal government and the seven eastern provinces involved in the agreement.

The position of the U.S. Government, however, is that more research is needed to establish the cause-and-effect relationship of acid rain before taking action to match the Canadian abatement effort.

Thus throughout the year, Ministry personnel made a special effort to inform the U.S. of the extent of the problem in Ontario, and to convince Americans that their co-operation is vital to the realization of the Canadian abatement target.

As a result, Ontario continued to express its concern to the U.S. Environmental Protection Agency and to individual state agencies when relaxation of State Implementation Plans for control of sulphur dioxide emissions were being considered.

Showings of acid rain films were arranged at Canadian consulates and on public television, and Ministry personnel participated in U.S. acid rain seminars and Congressional hearings.

A tour of the Dorset field site, located in one of the Province's most sensitive areas, was arranged for the U.S. National Acid Precipitation Assessment Plan Task Force.

They visited the site as part of their annual meeting with the Canadian Federal-Provincial Long Range Transport of Atmospheric Pollutants Research and Monitoring Committee.

Acid rain report

As part of its efforts to increase public awareness of the acid rain problem during 1983-84, the Ministry released a weekly acid rain report to the news media every Tuesday.

The information is collected from monitoring stations such as the one pictured at right.

Prepared jointly with Environment Canada, the report summarizes the pH of rain and snow over the preceeding seven days at various areas in eastern Canada, including Ontario's Dorset site.

Improving waste management

Ontario's Blueprint for Waste Management was released in June, 1983, at the 30th annual Ontario Industrial Waste Conference in Toronto.

The 75-page Blueprint and its 11 appendices presented a comprehensive series of Ministry proposals, including proposed controls and regulations to cover the full spectrum of waste management from generation through recycling to

post-disposal environmental security.

The report was distributed to a large number of groups, organizations and individuals with interests and responsibilities in waste management.

During the summer of 1983, the Ministry conducted an extensive series of public information meetings to explain the Blueprint proposals in greater detail.

Fifty presentations were made to municipalities, public interest groups, industry associations and government agencies; 16 public information "open houses" were held for the general public, and three workshops were held with special groups.

During September and October of 1983, the Ministry held public forums at 20 locations around Ontario to provide the public with an opportunity to present written or oral submissions in response to the Blueprint.

All submissions are being carefully analysed and will be used in updating and refining the original proposals.

Preparing for emergencies

"Pouring oil on the waters," may be a euphemism for solving trouble to most people, but to the Ministry's Emergency Response Co-ordination Office it means that trouble has just begun.

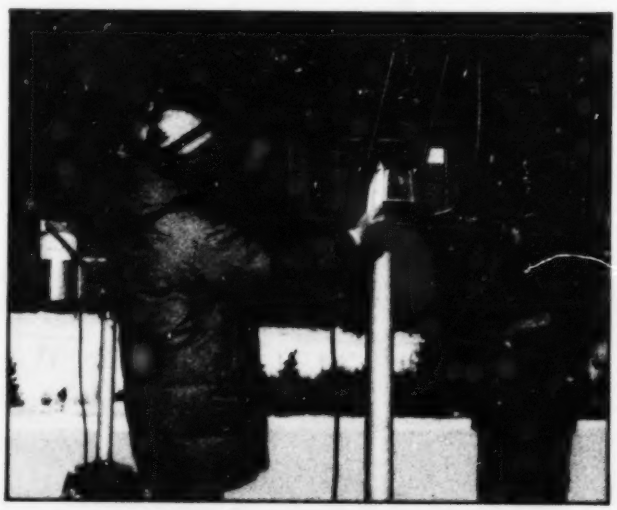
The office, which received 607 reports of spill incidents from across the Province in 1983-84, maintains and updates the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials.

The reports are summarized to obtain statistics on the causes, extent, and nature of the spills, and the data used in the development of policy and regulations to protect the environment.

In the past year the office assisted in providing an up-to-date field communications system and in the assessment of equipment and techniques used in field operations.

The office also co-ordinated the Ministry's participation in simulated exercises to prepare workers for the real thing.

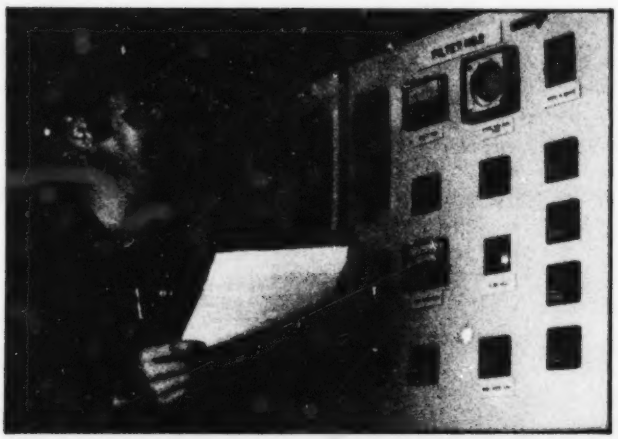
During 1983-84, personnel joined with Transport Canada on marine spill exercises, representatives from municipalities and industry on various other types of spill exercises, and with the Ministry of the Solicitor General on a nuclear exercise.

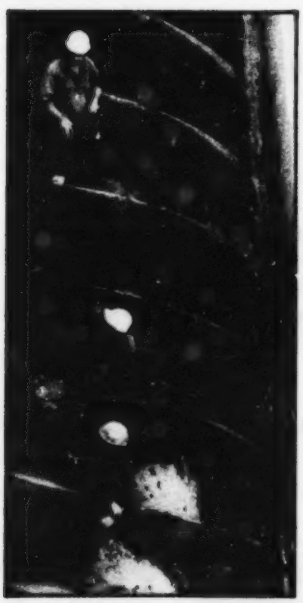


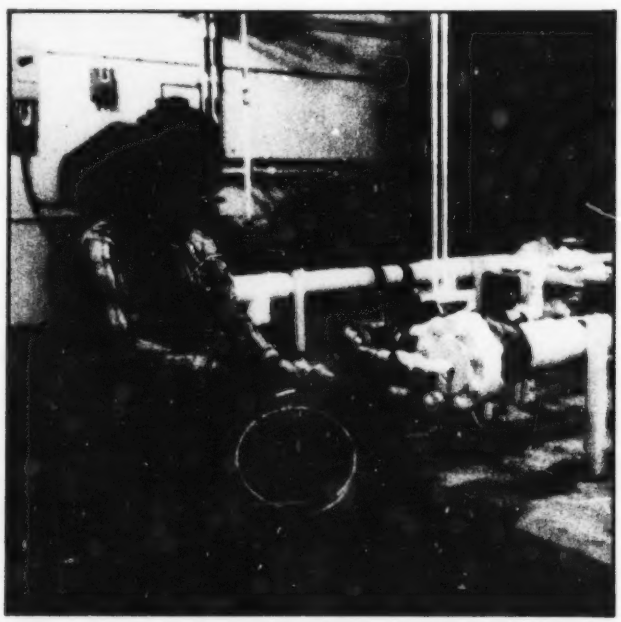
Finance and Administration Division

1983-84 Finance and administration highlights:

- Ministry spends $63.9 million on operation of sewage and water treatment plants.
- Ontario's net investment in sewage and water treatment facilities now $1.1 billion.
- New billing system for municipal water and sewage rates implemented.
- Comprehensive auditing procedures initiated.
- Information systems improved.







$63.9 Million in Sewage and Water Works

Far from pouring money down the drain, the Ministry spent $63.9 million this year to operate Ontario's sewage and water works systems.

Operated under agreements with municipalities and industrial concerns, these systems generated total revenues from investment and operation of $118.5 million during the same period.

As of March 31, 1984, Ontario's net investment in this high priority area of environmental health stands at $1.1 billion, and represents some 800 agreements with municipalities across the Province.

New billing system

For Ontario municipalities, the heavy consumer impact of the old five-year billing cycle for sewage and water rates is now a thing of the past.

New amendments to the Ontario Water Resources Act now allow the Ministry to conduct the service rate reviews annually, rather than once every five years.

The legislative amendments passed this year also allow the Capital Financing and Revenue Branch to implement a new system to bill municipalities on equal monthly charges instead of service charges based on the volume of water and sewage treated.

This streamlining of the billing process will significantly improve budgeting and cash flow planning of both the Province and its client municipalities.

Audit update

More help for Ministry managers is on the way as a result of a new training program developed this year by the Management Audit Branch.

The program was designed to enable staff to make use of the latest methods in undertaking "value for money" audits of the Ministry's operations.

Unlike purely financial systems of auditing, "value for money" auditing techniques evaluate both financial controls and management procedures.

Thus Audit Branch staff are now in a position to play an expanded role as advisers to management personnel on factors which govern not only the economy, but the overall efficiency and effectiveness of their departments.

New systems developed

As new data and techniques become available, the Ministry's computerized information systems are constantly being developed and improved.

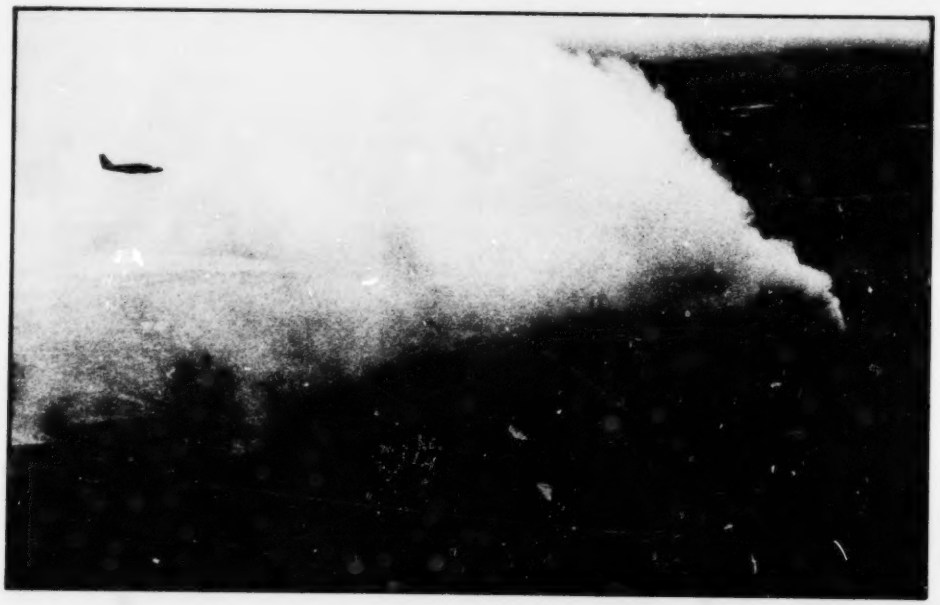
The Office of Systems Development, for example, undertook the following major projects during 1983-84:

- A feasibility study to develop a new Air Quality Telemetry System.
- Modifications to the Sample Information System.
- Modifications to the Waste Site Information System.
- Further development of the Industrial Waste Waybill System.
- Expansion of the processing facilities for the Laboratory Information System.
- A feasibility study to assess the need for new computer facilities in the Northwestern Region.
- Implementation of the Industrial Monitoring Information System.

Deputy Minister's Office

1983-84 Deputy minister's office highlights:

- $2.4 million spent on external scientific research.
- Management-By-Results system improved.
- New environmental options and policies studied.
- Fines levied against polluters.
- Opportunities for women increased.
- French language services expanded.
- Environmental packaging prizes awarded.
- Women volunteers provide Ministry eye-in-the-sky.



$2.4 Million spent on external research

Scientific research, and the resources to carry out that research, provide the intelligence lifeline in the Ministry's battle to protect the environment.

In 1983-84, for example, the Ministry's Policy and Planning Branch co-ordinated the management of 67 non-Ministry research projects costing $2.4 million.

In addition, a new research planning process was implemented and a research plan developed for air pollution and water, liquid and solid waste research.

New environmental options

In 1983-84 the Policy and Planning Branch made a number of social and economic studies of proposed environmental policy options in waste management, environmental standards and pollution control.

The branch also assisted in the study of acid rain and approaches to its control in Ontario.

Jumping on dumpers

Staff of the Ministry's Legal Services Branch handled 75 prosecutions which were initiated during the fiscal year.

Program evaluations

The Policy and Planning Branch implemented eight of 13 new management standards and carried out program evaluations of the Water Resources and Laboratory Services and Applied Research branches in 1983-84.

The evaluations were part of this year's reorganization of the Environmental Planning Division.

The highest fines imposed as a result of these prosecutions totalled $3,057,000 and were levied against a disposal company and one individual operator.

The branch prepared extensive amendments to the Environmental Protection Act and the Water Resources Act which were enacted by the Legislature, and took part in interventions and legal procedures in the United States concerning transboundary pollution in the Niagara River.

Staff also acted as counsel for the Ministry in several major environmental hearings held this year.

Opportunities for women expanded

The Ministry's Affirmative Action Office reports that two women have been made branch directors and a woman has been hired as a chief operator in the plant operations area.

The office also explained that the largest amount of staffing dollars spent during the year was expended on training women in technical and professional courses.

In addition, the manager of the program upgraded her professional experience by taking part in a three-month secondment to the Ontario Women's Directorate.

Regular program activities were carried on with the Women's Advisory Committee, and the office published two newsletters detailing opportunities for women during the fiscal year.

French language services

Bilingual capability has now been developed in 13 of the Ministry's 23 branches and in 11 of its 13 district offices.

An extensive campaign aimed at Franco-Ontarians was conducted this year to promote programs and services in French.

The Ministry also increased the number of bilingual forms available to the public from 28 in 1982-83 to 59 in 1983-84.

As well, the Environmental Explorations Program was conducted bilingually this year, promoting environmental studies in French in 54 locations across Ontario.

Educational material on the environment, as well as many of the Ministry's non-technical publications and about 75 per cent of its fact sheets, can now also be obtained in French.

Show and tell

During the year displays on acid rain and pesticides were staged by the Communications Branch at more than a dozen major fairs and events throughout Ontario.

Included in the displays were presentations at the Canadian National Exhibition, the International Plowing Match, the Sault Ste. Marie Sportsman's Show and at the Agricultural Safety Association's gathering in Ottawa.

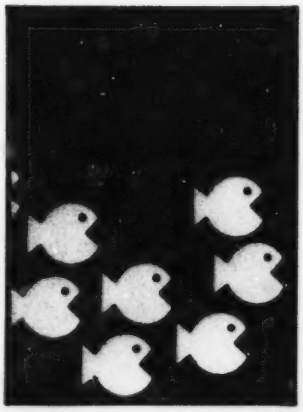
Open houses and tours, some especially arranged for legislators, scientific task forces and news media from the United States, were staged at the Ministry's Acid Rain Research Centre at Dorset.

The branch answered more than 15,000 public enquiries by telephone and mail and arranged special seminars, hearings and meetings as part of the Ministry's public participation program in areas such as the Blueprint for Waste Management.

Fish story

The sixth annual edition of the bilingual Guide to Eating Ontario Sport Fish was published and 150,000 copies distributed free during 1983-84.

Designed to provide the angler and consumer with information on elements such as mercury, polychlorinated biphenyls (PCBs) or other trace contaminants in sport fish, the guide contains data on more than 75,000 fish collected from 1,200 rivers, lakes, and areas of the Great Lakes.



Popular publications

Cottage Country, a popular bilingual environmental manual for the cottager was updated, reprinted and distributed in co-operation with the Federation of Ontario Cottagers' Associations.

The manual is designed as a guide to the protection and preservation of Ontario's vacationlands.

The Communications Branch also produced an award-winning tabloid which was inserted in local newspapers. The tabloid explained, in layman's language, a hydrogeological report on a landfill site in Tiny Township.

Pitching in to clean up

Again this year the Communications Branch assisted the Ontario Federation of Anglers and Hunters in staging its annual Pitch-In campaign to clean up litter.

Members of more than 1,800 groups, almost a 50 per cent increase over last year's turnout, scoured rivers, streams, shorelines, trails and back roads all over Ontario.

They cleaned up and cleared away hundreds of tonnes of litter and junk in the process.

The 552 delegates who attended this year's 31st Industrial Waste Conference, which was co-ordinated by the branch, made a different, but no less significant contribution to cleaning up the environment.

Prize packages

Five students of industrial design from Humber and St. Lawrence colleges were awarded prizes at this year's All-Ontario Environmental Packaging Competition.

Jointly sponsored by the Communications Branch, the Packaging Association of Canada and the Ministry's Waste Management Branch, the contest seeks to encourage young designers to think of tomorrow in environmental terms.

The reduction of material and energy waste from packaging and garbage disposal is a prime consideration of the judges.

The five students won their prizes for the design of environmentally sound packaging of personal hygiene products.

Students sent back to school

Eight university students employed by the Communications Branch were sent back to school last year.

In fact, the students were sent to 413 schools, resident camps and provincial parks across Ontario, where they lectured and provided information on environmental programs to other students and adults.

The eight summer students were part of the Ministry's 16-week Environmental Explorations Program, which is designed to promote interest and concern for the environment.

More than 100,000 people attended the summer sessions in 1983-84.

High flying femmes

For the sixth year a group of adventurous women pilots has flown volunteer surveillance and photographic patrols over Ontario's major waterways.

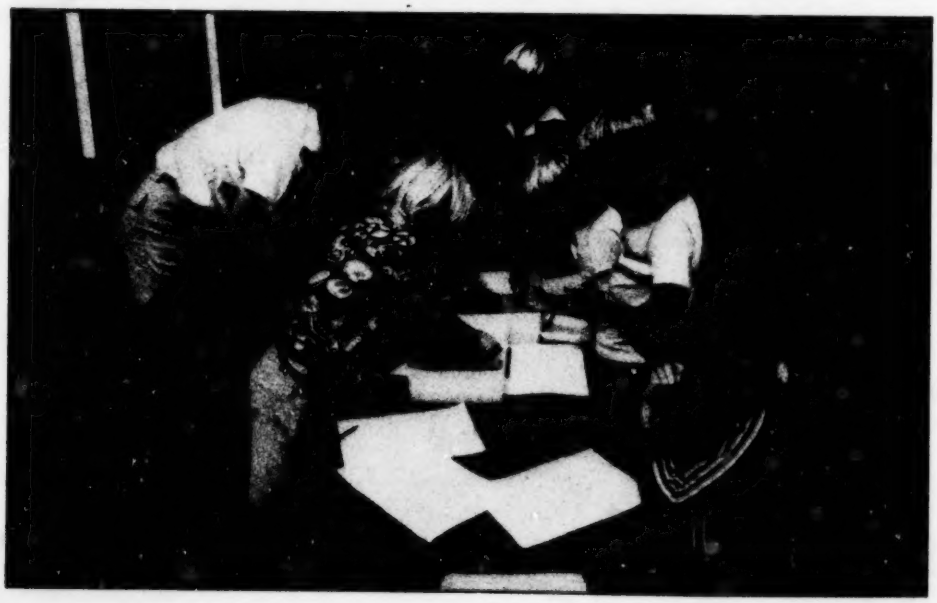
The pilots are members of the Ninety-Nines Inc., an international organization of female flyers who assist the Ministry in its Operation Skywatch.

The group's name, incidentally comes from the original number of members who banded together in 1929 to broaden opportunities for women in aviation. Their first president was famous flyer Amelia Earhart.

About 75 Canadian women are now involved in the eye-in-the-sky operation, in which airborne investigators from the Ministry's regions detect and photograph pollution sources.

Shorelines are monitored for oil spills, aquatic vegetation patterns, sediment from rivers and other sources of pollution such as erosion areas, waste discharges and landfill sites.

In 1983-84, the Skywatch aircraft was modified for limited vertical photography, which has improved the operation's surveillance potential.



Adding up the interest

An idea of just how topical the subject of the environment is becoming can be gained from some statistics provided by the Ministry's Library Services Section.

During 1983-84, 2,311 members of the public used the section's public reading room and the library circulated 13,747 books and loaned 7,489 journals relevant to the environment.

Associated agencies, boards and committees

There are a number of agencies, boards and committees associated with the Ministry of the Environment.

The relationship between some of these groups and the Ministry is that of an independent tribunal which reports to the Legislature through the Minister.

Environmental Assessment Board

The Environmental Assessment Board conducts public hearings on environmental issues under the following legislation (the number of hearings which took place during fiscal 1983-84 being indicated after each act in parenthesis):

The Ontario Water Resources Act	(8)
The Environmental Protection Act	(12)
The Environmental Assessment Act	(0)
The Consolidated Hearings Act	(7)

In July, 1983, the board developed a brochure entitled a Guide for Hearings intended to assist all members of the public who wish to take part in its hearings.

During the fiscal year the board also initiated experimental mediation procedures involving a proposal in the North Simcoe area.

Operating expenses of the board for the fiscal year amounted to approximately $811,808.

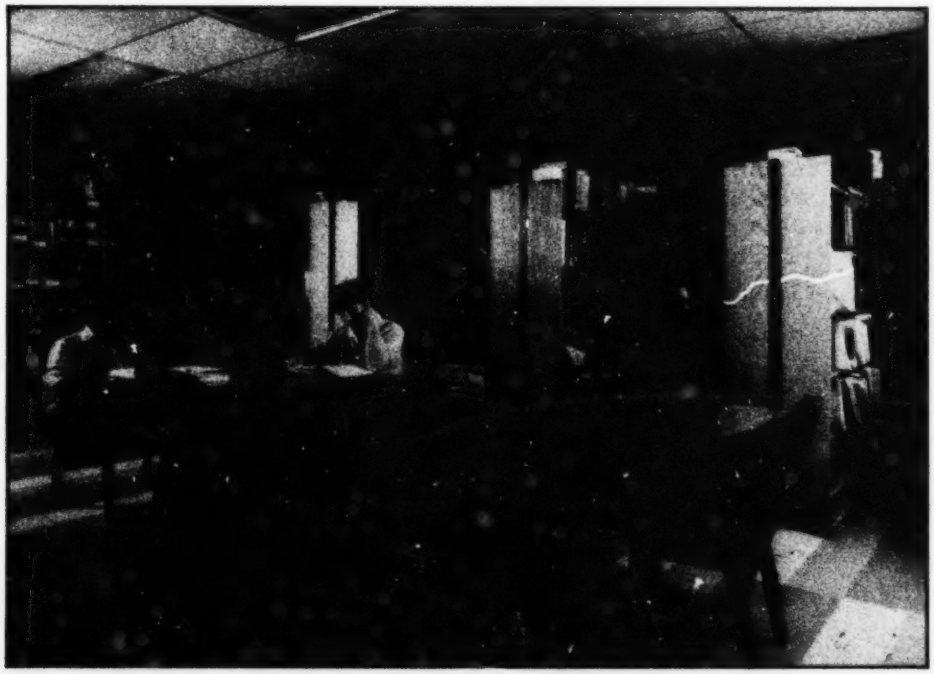
Environmental Appeal Board

The Environmental Appeal Board provides an appeal mechanism for persons affected by certain decisions made by the Ministry or by local health units.

In 1983-84 the board received 25 appeals. Approximately 56 per cent of these appeals concerned decisions of local health units on private sewage systems.

The remaining appeals resulted from Ministry decisions regarding waste disposal sites, waste management systems, waterworks and air pollution control.

The board held 19 days of hearings. It resolved 19 of the appeals received during the year and 12 appeals from the previous year. One appeal from



the previous year remained in abeyance.

At year-end, decisions remained to be issued, or hearings held, on six appeals.

Environmental Assessment Advisory Committee

The Ontario Environmental Assessment Advisory Committee, established in 1983, carries out three different kinds of review:

Category A, an open review, provides for public notice and consultation at the discretion of the committee.

Category B, a defined review, provides for public notice and consultation with directly affected groups to be selected either by ministerial direction or by the committee itself.

Category C, an internal review, does not provide for public notice. The Minister informs the committee that he has made a preliminary determination on the request, and the committee's advice is then given.

Members must report on Category A referrals within six weeks, on Category B referrals within four weeks, and on Category C referrals within one or two weeks.

At the end of the fiscal year the committee had reported to the Minister on five Category B referrals and five Category C referrals.

Ontario Scientific Advisory Committee on Dioxins and Furans (OSAC)

This new five-member committee advises on the setting of standards for the presence of dioxins, dibenzofurans, and other related substances in drinking water and air emissions.

During the fiscal year the committee held consultation meetings with Ministry staff and personnel of the Air Resources Branch, Environment Canada, the U.S. Environmental Protection Agency and Dow Chemical Canada.

Committee members also reviewed and revised a number of important scientific documents and reports during the year.

Pesticides Advisory Committee

The Pesticides Advisory Committee annually reviews the Pesticides Act, its regulations, and government publications concerning pests and pesticides.

The committee also enquires into matters directly related to pesticides and the control of pests.

In 1983-84, the committee recommended changes to Ontario Regulation 751 and evaluated the environmental impact, toxicity, and hazard of four new active pesticide ingredients.

One-hundred-and-sixty-seven newly registered products, including 11 fertilizers containing pesticides, were evaluated, and a scheduled classification for storage, sale and use was recommended for each.

A review resulted in the reclassification of 15 products and the removal of 11 from the active list of scheduled products, and overall guidelines for pesticide products were reviewed and updated.

During the year the committee continued its scientific research program to find safe pesticides, determine the hazards of those already in use, and reduce pesticide influence on the environment.

The Committee reviewed 47 research proposals of which 25 were funded by the Ministry at a cost of $300,300.

A symposium was held in January, 1984, at which grant recipients reported on their findings in preparation for the committee's annual research report.

Farm Pollution Advisory Committee

Consisting of four prominent farmers, this committee provides objective assessment of farm environmental situations as requested by Ministry officials.

The committee visits farms to investigate complaints and make recommendations concerning manure storage and spreading, cultivation, yard drainage, and ventilation of livestock and poultry buildings.

In 1983-84, the committee investigated complaints about beef feedlots and poultry farms.

Ontario Waste Management Corporation

The Ontario Waste Management Corporation (OWMC), is responsible for the construction and operation of a Province-wide system for the treatment and disposal of liquid industrial and hazardous waste.

The corporation is also responsible for developing a long-term program to assist in the reduction and recycling of such wastes in Ontario.

By the end of fiscal 1983-84, three phases of a five-phase facilities development process were completed and reports on each phase issued.

The process is designed to prepare detailed proposals on appropriate technologies and sites for industrial waste disposal systems.

The agency's activities during the year also included the hiring of an engineering firm as consultants to the project and market surveys of 1,000 Ontario industries.

The surveys were to determine the type and quantity of industrial and hazardous wastes that require special treatment.

Industrial Waste Management Hearing Panel

The Hearing Panel on Industrial Waste Management was established to investigate, hold hearings, and report on the Ontario Waste Management Corporation's proposal to locate and build waste management facilities.

Their public hearings and report deal with each proposed facility, whether sites are safe and technologically sound, and whether the facility is to be constructed in an environmentally sound manner.

The five-member panel, an independent body, reports to the Lieutenant-Governor-in-Council.